

AUTOMOTIVE INDUSTRIES

Volume 61
Number 13

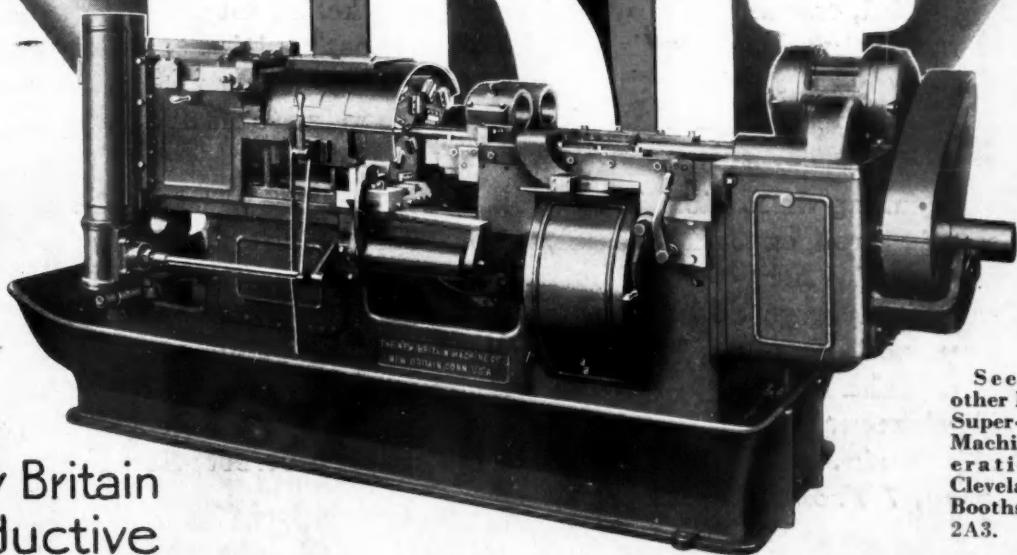
PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, SEPTEMBER 28, 1929

35c a copy
\$3.00 a year

Super Production

NEW BRITAIN NEW-MATICS

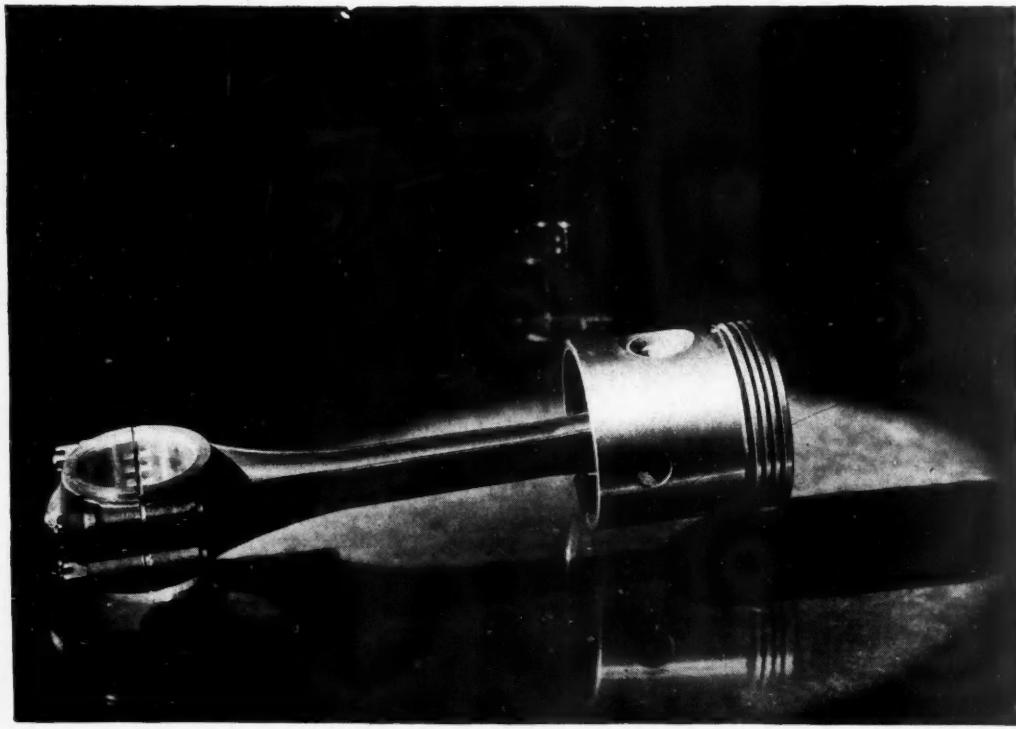
100



See this and
other New Britain
Super-Production
Machines in op-
eration at the
Cleveland Show —
Booths 2W26 and
2A3.

"New Britain
Productive
Capacities Always Justify Initial Investment"

The New Britain-Gridley Machine Co. New Britain, Conn.



Hidden Flaws DETECTED

BEFORE any connecting rod is put into a Waukesha Engine it is "right." After leaving the forge shop each rod is subjected to the *special deflection test*. Even the most minute defect, either in heat treatment or quality of material, cannot "get by." It was Waukesha engineering ingenuity that devised this simplest and most positive test...that definitely determines the fitness of a connecting rod to stand the stress of high duty in the modern automotive engine. *Waukesha connecting rods stand up.*

Bearing distortion is also eliminated. The reinforced connecting rod caps are heavily ribbed and held in place by four big, special heat-treated bolts. Besides this great bearing stiffness, the large end of the connecting rod is ground to fit the removable bearing. Many other reasons for the long life of Waukesha Engines are given in Bulletin 681. Write *Automotive Equipment Division, Waukesha Motor Company, Waukesha, Wisconsin. Offices: New York, 8 West 40th Street; San Francisco, 7 Front Street.*

WAUKESHA ENGINES

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Reg. U. S. Pat. Off.
Established 1902

Vol. 61

No. 13

NORMAN G. SHIDLE, Directing Editor
P. M. HELDT, Engineering Editor
JOSEPH GESCHLIN, Asso. Eng. Editor
ATHEL F. DENHAM, Field Editor
M. WARREN BAKER, Field Editor

EARL O. EWAN, Managing Editor
HAROLD E. HILLMANN, Asst. Editor
LESLIE PEAT, News Editor
HAROLD M. BAKER, Detroit News Rep.
A. B. CROFOOT, N. Y. News Rep.

Contents

Operators Assail Expert's Thesis for Higher Vehicle Taxation. By George T. Hook	433
Growth of Russian Motor Industry Upon Road Programs. By King Hamilton Grayson	437
Welding Society's Research Work Covers Fundamental Practice	439
Landis Semi-Automatic Cam Grinder is Completely Motorized	442
Stewart Announces Seven-Ton Truck With Four-Speed Transmission	443
Just Among Ourselves	444
Machinability Tests of Metals Give Almost Concordant Result	445
Petroleum Research Sought	447
Revised Federal Airworthiness Code of Licensing Requirements Increases Margin of Safety. By A. B. Crofoot	450
New Developments	456
News of the Industry	458
Men of the Industry	464
Financial Notes	466
Calendar of Events	468
Advertisers' Index	104, 105

Automotive Industries is published every Saturday by
CHILTON CLASS JOURNAL COMPANY
Chestnut and 56th Streets, Philadelphia, Pa.

C. A. MUSSelman, President and General Manager
J. S. HILDRETH, Vice-Pres. and Director of Sales
W. I. RALPH, Vice-Pres.
A. H. VAUX, Secretary and Treasurer
JOHN A. CLEMENTS, Ass't Treasurer
JULIAN CHASE, Business Manager
Automotive Industries
Cable Address..... Autoland, Philadelphia
Telephone

GEO. D. ROBERTS
Advertising Manager
Sherwood 1424.

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 0080
Chicago—5 South Wabash Ave., Phone Central 7045
Detroit—710 Stephenson Bldg., Phone Northway 2090
Cleveland—1140 Guardian Bldg., Phone Main 8866
Los Angeles—433 Petroleum Securities Bldg., Phone Westmore 9084

Controlled by United Business Publishers Inc., 239 West 39th Street, New York;
ANDREW C. PEARSON, Chairman, Board of Directors; FRITZ J. FRANK, President;
C. A. MUSSelman, Vice-President; F. C. STEVENS, Treasurer.

SUBSCRIPTION RATES: United States, Mexico, United States Possessions, Canada and all countries in Postal Union, \$3.00 per year; Foreign, \$6.00 per year
Single Copies 35c.

COPYRIGHT, 1929, CHILTON CLASS JOURNAL COMPANY
Member of the Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Automotive Industries — The Automobile is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

Automatic PROTECTION



DUSTLESS AIR TO THE MOTOR

—from abrasive oil, scored pistons and cylinders, clogged valves and heavy carbon deposits

WHY allow dust and dirt to play havoc with the fine motor that is characteristic of the modern car? Automobiles in every price class need this valuable accessory to sift grime and grit from the air, protecting the motor from needless wear and tear, avoiding costly repairs.

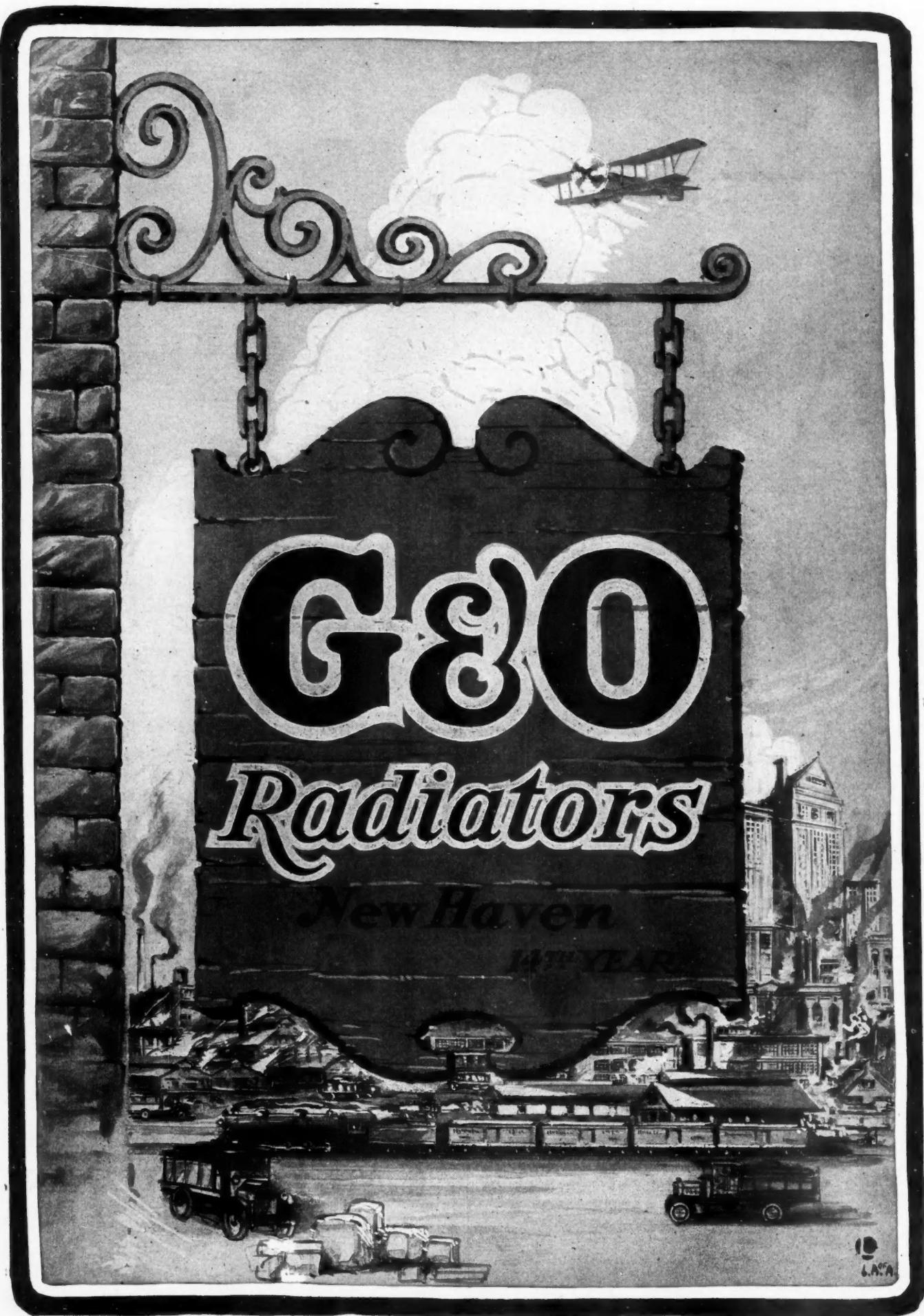
United Air Cleaners are easily installed . . . last the lifetime of the engine . . . insure perfect performance and maximum power. They have long been standard equipment on such cars as Lincoln, Chrysler, Dodge and Franklin. Once installed, no attention whatever is required—there are no pads to clean, no screens to clog. *They are entirely automatic.*

You add a strong selling point when your standard specifications include United Air Cleaners—tested and proved over a period of years. It's performance that counts . . . and UNITED assures it!

Let us explain to you just how economically you can provide this PROTECTION. Full details gladly supplied—without obligation! Write today!

THE **ABSOLUTELY NO PADS TO CLEAN
UNITED AIR CLEANER** NO SCREENS TO CLOG AUTOMATIC NOTHING FOR YOU TO DO

UNITED AIR CLEANER COMPANY
9702 Cottage Grove Ave. Chicago, Illinois



AUTOMOTIVE INDUSTRIES

VOLUME 61

Philadelphia, Saturday, September 28, 1929

NUMBER 13

Operators Assail Expert's Thesis for Higher Vehicle Taxation

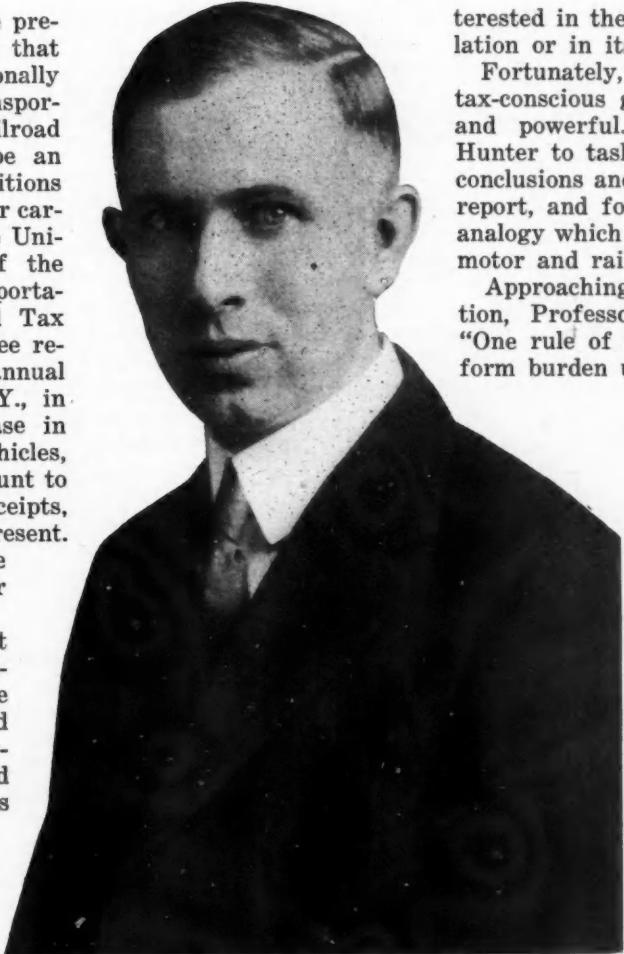
Prof. Hunter argues for increase of from 3 to 6 to 14 to 16 per cent on commercial cars, citing comparative inequalities of present levies as compared with those for railroads.

By GEORGE T. HOOK

Editor, Commercial Car Journal and Operation & Maintenance

LEADING one to believe by the preponderance of his argument that the government is unintentionally subsidizing commercial motor transportation in its competition with railroad service and that there should be an equalization of competitive conditions between the railways and the motor carriers, Prof. M. H. Hunter, of the University of Illinois, chairman of the Commercial Motor Vehicle Transportation Committee of the National Tax Association, presented a committee report to the association's recent annual convention at Saranac Inn, N. Y., in which he argued for an increase in taxes levied on all commercial vehicles, so that the total paid would amount to 14 to 16 per cent of their gross receipts, instead of the 3 to 6 per cent at present. The report was entitled, "The Taxation of Commercial Motor Transportation."

It is altogether probable that this report, if it had gone unchallenged, would, in the words of one truck executive, "have caused more drastic attacks by state legislatures on the motor truck and bus through proposed tax levies than any publicity that has ever been put out." The report was made to 785 delegates from 44 states, three Canadian provinces and Porto Rico. Those present included several governors, tax experts appointed by governors, tax administrators, economists, bankers and others either in-



Prof. M. F. Hunter, of the University of Illinois, whose report on the competitive aspects of bus and rail transportation was criticised at the meeting of the National Tax Association held at Saranac Inn, N. Y., last week

terested in the formulation of tax legislation or in its administration.

Fortunately, the challenges before this tax-conscious group were both plentiful and powerful. They took Professor Hunter to task for the major premises, conclusions and theories advanced in the report, and for his failure to draw the analogy which exists in fact between the motor and railroad industries.

Approaching the subject of equalization, Professor Hunter's report said: "One rule of taxation is to levy a uniform burden upon competitive business.

If, through some action of the government undertaken for the public welfare, a particular business receives some advantage not enjoyed by its competitors, then there is an unwarranted subsidy. Justice would dictate the reasonableness of a tax sufficient to offset this unintentional subsidy. In the case of commercial motor carriers, then, if the gasoline tax, plus other payments to the government, does not impose a burden equal to tax burdens upon competitors, together with a charge to offset the subsidy from highway construction and maintenance, then there

should be the levy of an additional tax."

Admitting there may be some question as to just how to measure the value of the "unintentional subsidy," the report continued: "One method is to make a direct comparison with the business with which the motor carriers are the most obvious competitors—the railroads. The railroads own their right of way and trackage, and must provide for their maintenance. It is in this aspect of the business that the highway subsidy favors the one competitor—the motor carrier. To equalize conditions, then, the government should impose upon the motor carriers a total burden equal to the taxes upon railroads plus the carrying and maintenance charge upon their right-of-way and trackage."

The report then proceeded to make a comparison of the present burden upon the two types of transportation. "For the past three years the taxes paid by Class 1 railroads averaged about \$385,000,000 a year. On a 5 per cent basis the carrying charge on the book investment in roadway and structures is about \$975,000,000, the expense of maintenance of way and structures is about \$858,000,000. The total annual cost to the railroads arising from taxes and the provision for necessary roadways and structures is something like \$2,218,000,000. The total gross operating revenue in 1928 was about \$6,105,208,000. Thus the costs calculated above represent more than 35 per cent of the total gross operating revenue."

"From calculations made by the Motor Bus Division of the American Automobile Association the gross revenue from all common carrier buses for 1929 was \$366,000,000. The total taxes paid were \$22,000,000, or slightly more than 6 per cent of the gross receipts. The same organization has calculated the average gross receipts for a three-ton truck to be \$15,000, the average gasoline tax \$162.22, and the average license for a truck with pneumatic tires, \$210.90. If we assume other charges by the government units to bring the total tax payment to \$450, then the taxes equal 3 per cent of the gross receipts.

Report's Purpose Defined

"It appears from these calculations, if the purpose be to equalize competitive conditions between the railroads and the motor carriers, that the charge made by the government upon the motor carriers should be much higher than at present. It may be fair to inquire, however, as to the justice of saddling upon the gross receipts of motor carriers a carrying and maintenance charge equal to that borne by the railroads when such a charge, which can be ascribed to highways used by them, is much smaller. We do not penalize one railroad just because it has some natural advantage in its right-of-way, and the contention has merit that one transportation agency should not be penalized just because it chances to have access to some natural advantage not possessed by others. Any charge, then, in addition to a tax burden comparable to that upon competitors, should no more than equal the carrying and maintenance charge upon that portion of the highways which can properly be allocated to commercial carriers.

"There is only one type of data available upon which any allocation can be made, and that is the number of



vehicles. Of the total number of vehicles registered about one twenty-fifth were buses and trucks for hire. On this basis, then, about 25,000 miles of the 625,000 miles of improved highways could be properly allocated to commercial carriers.

The carrying charge upon this on a 5 per cent basis, calculating the cost per mile at \$30,000, is \$47,500,000 per year. The present average annual maintenance charge of state highways is about \$1,200 per mile. For the 25,000 miles allocated to commercial carriers this would be \$30,000,000, or a total carrying and maintenance charge of \$67,500,000. Practically one-half of the carriers for hire are buses, so, on the basis of numbers, \$44,750,000 would be the share of the charge which should be borne by them. This represents about 10 per cent of their gross receipts. The total taxes upon railroads are about 6 per cent of their gross receipts. On this basis, then, the exaction of the government from motor carriers would not be unreasonable unless it exceeded this 6 per cent plus 10 per cent—the carrying and maintenance charge upon that portion of the highways allocated to commercial carriers or a total of 16 per cent of their gross receipts.

Studied 100 Companies

Dealing solely with operating statistics of 100 bus companies collected by the American Automobile Association, the report, considering only those companies operating at a profit, declared "it took 2.6 per cent of the operating revenue to produce a net return of 5½ per cent on the investment. On this basis, then, for companies operating at a profit, the tax might be increased from the present 6.72 per cent of gross receipts to about 14 per cent, but to go above this would impair the return of 5½ per cent."

While complaining that Professor Hunter's report is largely based on bus data which is loosely applied to all "business vehicles," the minority report framed by C. B. Baldwin, chairman of the Highway Transportation Committee of the National Industrial Traffic League, took exception to the above arguments and conclusions of Professor Hunter's report as follows:

"The railroads own or control, or, in other words, have the exclusive use of the right-of-way over which the railroad operates, whereas the commercial vehicle has not more right to the highway than its competitor, including the railroad, if it sees fit to operate over the highway. The business handled by the motor truck is in no way comparable with that handled by the railroad. For example, a 5-ton truck with two men, or possibly a 5-ton truck with trailer and three men, would represent the maximum unit moving at one time, whereas the railroad could move a train of 75 cars loaded with 30 to 50 tons each with three men besides the engineer and fireman as a unit at one time, and the cost would be but a fraction of the cost of the motor truck haul.

"To assess taxes in the same proportion, therefore, would be grossly unfair.

"There are some who feel that the taxes borne by the railroads are unduly burdensome, and if such is the case nothing could be gained in the long run by placing an unjust tax on a competitive transportation

agency so important and necessary to industry as the motor truck is today.

"A tax of 16 per cent of the gross receipts would, in all probability, force the majority of commercial motor truck carriers into bankruptcy, due to the fact that the margin of profit is seldom in excess of 5 per cent, and more likely to be less than 3 per cent. As to the tax upon the industry owning the truck, no better way could be found, in my opinion, to hamper the free movement of goods and create congestion, for it is almost certain that to many concerns this increased burden would make the operation of trucks prohibitive."

The minority report included some interesting testimony from the railroad side by quoting from a recent address made by A. L. Janes, assistant general counsel of the Great Northern Railroad. Said Mr. Janes: "To what extent the Interstate Commerce Commission should consider the effect upon forms of transportation other than highway transportation, which must be railroad transportation, is a matter of serious doubt. My own personal opinion is that highway transportation should stand alone; that the commission should only consider, in granting a certificate, the effect upon highway transportation and not consider the effect upon rail transportation. The two forms of transportation are dissimilar."

Railroad Subsidies

The direct assault by the minority group was intensified by a cross-fire of comments from H. S. Fairbanks, of the U. S. Bureau of Public Roads. These were written after a perusal of the report but were not presented to the convention. Mr. Fairbanks riddled every point made by Professor Hunter except one. He found himself in hearty agreement with the statement that "one transportation agency should not be penalized just because it chances to have access to some natural advantage not possessed by others." His sole grief in this instance was that "the author's proposals do not seem to give adequate recognition to the merit of this view."

The following were some of Mr. Fairbanks' comments:

"Would not the proposal to take into account the highway subsidy of motor carriers in imposing taxes upon them in order to offset the right-of-way costs of their railroad competitors also have to be extended to ship lines? Does not the government by dredging channels, improving harbors, etc., 'unintentionally' subsidize the ship carriers? Has the author overlooked the substantial subsidies granted to railroads during their period of construction?

"In his comparison of the present burden upon the two types of transportation the author apparently overlooks taxes paid by motor carriers on property (vehicles, garages, depots, etc.), and income taxes in his estimates of taxes paid by these carriers. The rail taxes used in the argument, I assume, include all taxes paid.

"The cost of \$30,000 per mile is too high as an average cost of highway construction. The average cost of the 625,000 miles mentioned is less than \$20,000 a mile. The average maintenance charge of \$1,200 per mile is excessive. The total maintenance expenditure in 1927 was \$376,753,825, and a considerable portion of this sum was expended in roads not included in the surfaced mileage of 588,721—then completed, which corresponds to the mileage of 625,000 assumed for the present. Assuming that all of the above amount was

expended on the 588,721 miles the average per mile would be only \$650. Using \$20,000 as the average cost per mile of highway, the carrying and maintenance charge would be \$41,250,000 instead of the \$67,500,000 computed by the author; and the percentage of gross bus receipts would be 5.7 per cent instead of 10 per cent."

Also commenting upon the Hunter report by letter, F. D. Howell, chairman of the Taxation Committee of the California Motor Carriers Association, labeled as "far-fetched" any attempt to compare right-of-way and highway maintenance costs.

Maintenance vs. Pay Load

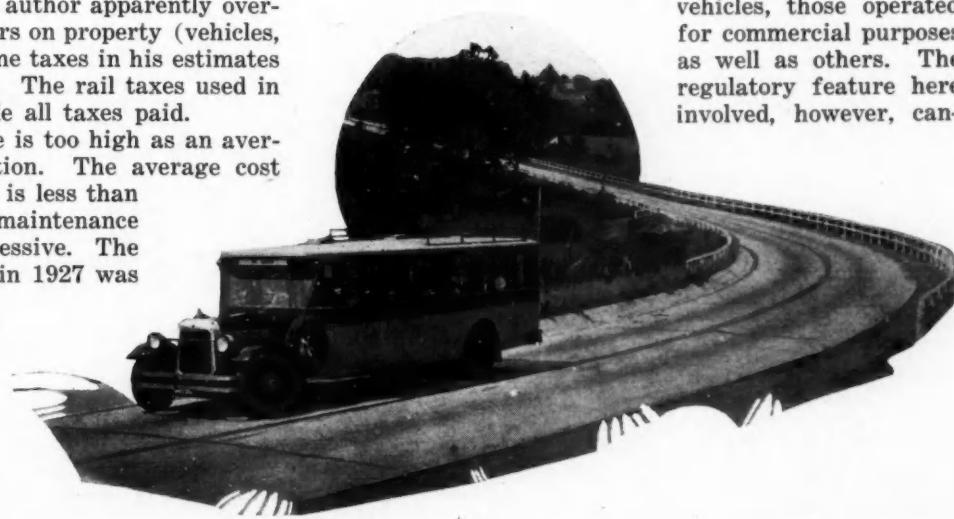
"The tremendous cost of maintaining the road-bed for rail transportation," he stated, "is offset by the reduced cost of such transportation. In other words, after spending all this money for maintaining a railroad road-bed, the railroad can then handle a whole train for \$1.50 a train mile, the capacity of the train being limited only by the power of the locomotive and grades encountered. You may assume that this \$1.50 cost per mile is the cost of moving 1000 tons one mile (this is very low), whereas the motor carrier in common carrier service would be moving 7 tons one mile at say \$1.25, or, where the rail line moved 1000 tons for \$1.50, the motor carrier would move but 42 tons for \$1.50.

"That this excessive cost of motor vehicles balances the excessive cost of maintenance on railroads is evidenced by the fact that the motor carriers, both passenger and freight, are operating practically on competitive rates with the rail lines, and neither the rail lines nor the motor carriers are earning excessive profits."

Among the points brought out in oral discussion were general statements to the effect that "taxes are not levied to equalize the cost of doing business," and that "it is false principle to arrive at equalization as Hunter does."

The scope of Professor Hunter's report included a discussion of methods of levying taxes on commercial motor vehicles. In this regard he indicated the registration license should be of an amount sufficient merely to defray regulatory costs; that the gasoline tax seems to be the most logical and justifiable means of raising highway construction and maintenance revenue, and that the commercial motor vehicle should be recognized as a *business entity* and as such subject to taxation.

"As a protection to person and property," said Professor Hunter in his report, "every state requires the registration of motor vehicles, those operated for commercial purposes as well as others. The regulatory feature here involved, however, can-



not justify the size of the charge made in many states. The record of ownership, type of car, etc., could be secured just as readily by charging a fee just large enough to cover the cost, or by making no charge at all, for that matter.

"In some states the element of protection to highway has been the basis used for calculating the fee charge. Thus there is some relation between size of tire, type of tire, weight of vehicle, number of wheels and highway depreciation. . . . It is such factors that should be taken into consideration in the determination of the size of the fee to be levied upon motor carriers to legalize their use of the highways.

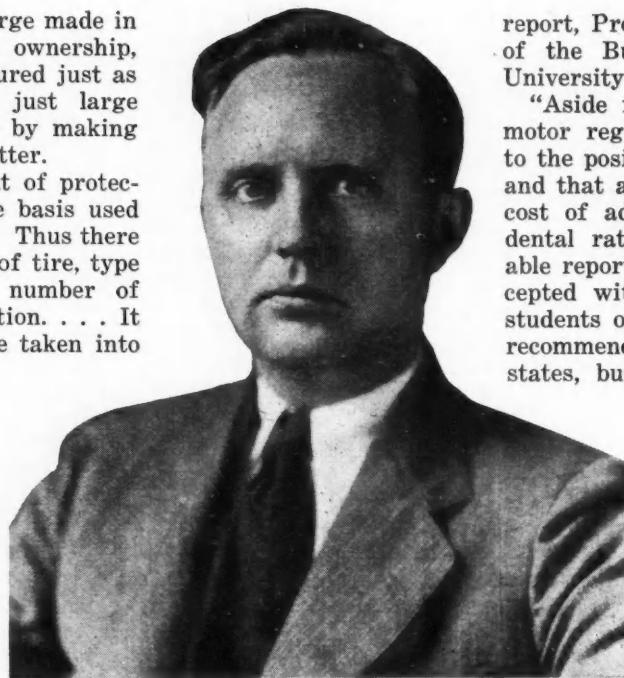
"Some surplus above costs of administration may result from the use of regulatory fees. This may well go into the highway fund, although any surplus should be incidental rather than predetermined. If it be decided to have the motorist contribute to a special fund for highway construction and maintenance, which decision is definitely established, some other basis than the fee should be used. The tax upon gasoline seems to be a happy as well as logical and justifiable solution of this problem.

Problem Lies in Methods

" . . . The use of the fee and gasoline tax takes cognizance only of the commercial motor vehicle as any other motor vehicle; it does not recognize it as a business entity and as such subject to taxation. The real problem of taxation of the commercial motor carrier, in distinction from other motor vehicles, lies in the amount of taxes to be levied upon it as a business, and in the method of levy. Commercial motor transportation is a business just as the business of manufacturing, farming or merchandising and should be called upon to contribute its share to the general revenue fund. The first problem is to decide how much this shall be in addition to the amount already paid in fees, property and gasoline taxes. These payments must be considered as having been made for the common good, for there can be no other justification for the construction, maintenance and operation of highways."

The report thereafter indicated the methods already used in levying taxes upon buses and trucks as a business, Professor Hunter arriving at the conclusion that "the methods most in favor are levies upon gross earnings and upon passenger ton miles. An examination of the possible methods leads one to conclude that, from the standpoints of justice and administration the tax on gross earnings is the most desirable. It can easily be adjusted to make the variable element in arriving at the total tax burden. Calculations can be made from reports required to be furnished at the time application is made for a license. Accuracy of reports can be approximated by provision for revocation of license should any discrepancies occur, while to keep a record of gross receipts imposes no appreciable burden upon the operator."

In a formal discussion of this portion of the Hunter



Edward F. Loomis, secretary, motor truck committee, N.A.C.C., who pointed out at the National Tax Association meeting at Saranac Lake last week, that the common carrier trucks and buses pay 14 times and 24 times respectively as much taxes as the passenger automobile

report, Prof. James W. Martin, director of the Bureau of Business Research, University of Kentucky, declared:

"Aside from the suggestion that the motor registration license be relegated to the position of a mere regulatory fee and that any surplus revenue above the cost of administration 'should be incidental rather than predetermined,' the able report of the committee may be accepted without serious reservations by students of highway finance. Even that recommendation may be wise in some states, but many who are viewing the

country as a whole will agree with the original committee of the National Tax Association on highway finance that the registration fee is properly an important source of revenue. Some of the reasons for arguing with the earlier committee are as follows:

(1) Many states cannot reasonably raise adequate revenue by means of the gasoline tax alone. Kentucky and South Carolina, for example, would find themselves severely handicapped if they had to rely for motor vehicle revenue

on what their already high gasoline tax rates produce. (2) The motorists are willing to pay a registration tax in addition to a fuels tax to the end that roads may be improved. (3) The gasoline tax imposes an inadequate share of road financing cost on those—especially in northwestern states—who use their vehicles rarely although at times when the roads must accommodate 'peak loads.' (4) The gasoline tax, though doubtless the best single highway impost, is not adequately graduated in proportion to the sizes of vehicles. A 7-ton truck, many times as destructive to roads as a 3-ton vehicle, for example, will use only 30 to 60 per cent more gasoline. (5) As the committee suggests, a gas tax does not take adequate account of tire equipment. (6) The fact that the registration tax now yields the states about a third of a billion dollars without serious objection from those who pay it."

Minority Objections

The minority report, while tacitly concurring with Professor Hunter in regard to the gas tax and a registration fee for regulatory purposes only, objected to his taxation-as-a-business feature by finding fault with his failure to "define the terms and to indicate any their measurement of road use, or of business benefit."

"Except in the cases of buses," the minority group contended, "the state governments are in continual difficulty in attempting to measure and assess such business use. The time will come, and may be at hand, when commercial motor transportation may have sufficiently developed to justify taxation methods more exact in their measurement of road use, or of business benefit, if the latter theory is tenable."

In his correspondence commentary Mr. Fairbanks, of the U. S. Bureau of Public Roads, declared, "The two taxes (registration and gasoline) may well be regarded together as means of raising needed road revenue."

(Continued on page 441)

Growth of Russian Motor Industry Depends Upon Road Program

Avtodor, an organization formed to foster manufacturing concessions in Soviet Union, has begun a campaign of education for better highways. Plant in Moscow is contemplated.

By KING HAMILTON GRAYSON

LACK of improved roads has been largely responsible for the small number of 21,000 automobiles available for the estimated population of 150,000,000 in the Soviet Republic. Of 3,000,000 kilometers of roads in the Soviet Union, less than one-half of one per cent are of the gravel, self-draining type. The rest are simply dirt roads, usually unfit for any transportation except light horse-drawn vehicles. An organization has been formed to educate the republic on the construction of good highways and to encourage importation of motor vehicles and to foster foreign capital in developing the automotive industry in Russia. This organization, known as the Avtodor, or Society of Automobiles and Roads, has been instrumental in initiating plans for an automobile factory in Moscow.

The Society insists upon an output of 100,000 cars to consist of light passenger automobiles and trucks of 1.5 ton capacity. The planning commission anticipates having this factory in operation during 1929, but this is one of the branches of Soviet industry into which foreign capital and engineers are invited to engage, and it is hoped that this will stimulate the industry.

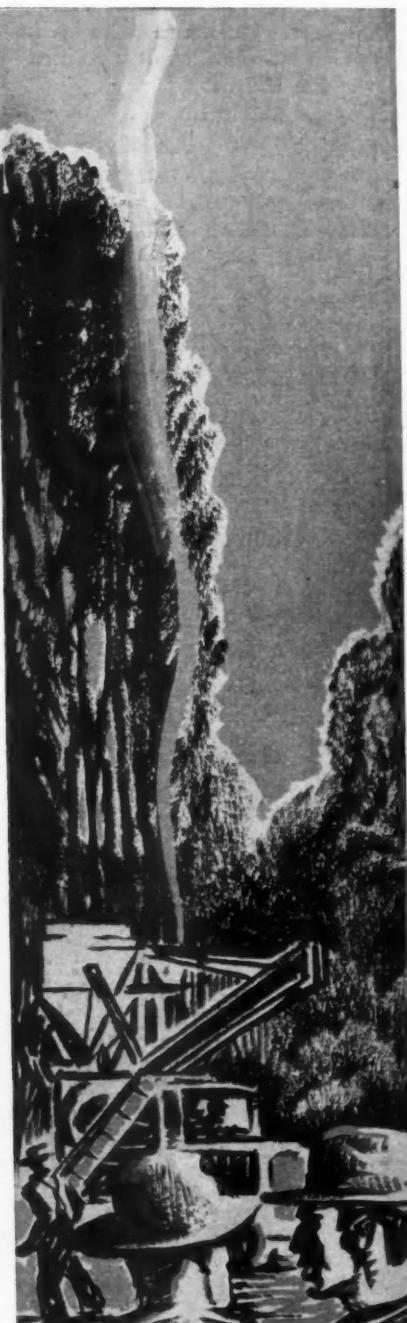
The official records for 1927 showed 9600 passenger cars, 9400 trucks and 2000 buses in operation. The present plant of the Amo has a capacity of 1500 trucks per year, but this is believed to be merely a beginning toward the actual requirements of the present, and the future promises to be exceptionally bright once the highways are given the attention planned. As the industry stands at present, without foreign capital and engineers, it will take ten years to reach a capacity of 100,000 cars per annum. The Avtodor has specified a road-building program of 25,000 kilometers of paved highways and 125,000 kilometers of modern surfaced roads within ten years.

Russia's traffic problem is more generally confined to that of providing more transportation of all kinds rather than one of regulation against congestion, excepting in cities, such as Moscow, with the narrow streets and dense population. The increased growth of the population in most of the larger cities, and the development of new interurban areas have put a burden of traffic on the present bus facilities. To meet this congestion the planning commission has authorized a number of improvements during 1929.

Motor buses were first introduced into Moscow during 1925 to relieve traffic congestions on the then existing trolley lines. By the end of 1927 the buses in that city had increased to 160, and had begun to gain a foot-

hold in Leningrad and other major cities. An appropriation for 1929 by the City of Moscow covers 200 additional buses of an average capacity for 36 passengers. The transportation department of the city estimates that the number in service will reach 1400 within the next three years. Five million dollars have already been appropriated toward capital investment in the bus lines for the next two years in Moscow alone.

There are now about 120 taxicabs in daily operation in Moscow; a lesser number in Leningrad and other cities, but it has already been budgeted to have 2000 modern cabs in service by the end of 1929 in Moscow, as those now in service are very old and in bad running condition. This is due to a tremendous number of makes and the impossibility of securing repair parts.



The narrow streets in the commercial section of the city have retarded motor transportation to a vast extent, but this will be remedied by the construction of the new subway for which \$20,000,000 has been appropriated. The motor bus has become very popular both in urban and interurban service, and a very large expansion is planned for 1929 in such sections where the highways will permit. The general plan calls for the addition of 4000 buses of the latest type, preferably to be built in shops now existing in the Soviet Republic under the direction of foreign engineers if they can be secured, and if not, as a necessity, to be purchased abroad.

Motor freight transport is rapidly gaining on such highways where it is possible to maintain service; mostly along the railroads where the building of extensions to mining and timbering properties is too costly or too slow. In the construction of the railroads, motor trucks are playing an ever-increasingly important part, being used both as motor lorries for transporting workers and for materials.

The Council of People's Commissars recently decreed many changes in the concessions policies of the Republic. Their action reaffirms the desire to encourage investment of foreign capital and to induce technicians to enter the industries in Russia. As the result of their actions, descriptions in foreign languages of various concessions have been published. Among those which

will receive especial consideration is that of the manufacture of automobiles, trucks, buses and motorcycles.

Under the conditions outlined, the concessionaires can dispose of their products freely with the exception that the Government retains the right to purchase on mutually satisfactory terms and prices. All machinery needed for the plants which is not possible of being secured from a Soviet plant can be imported free of duty. The concessionaires will have only one central tax to pay and reduced railroad rates will be given in such cases where it means the quicker building of the industry at an advantageous point.

All of these things are having a tendency to stimulate the subject of automobile and bus transportation, which has been held in check on account of the roads and because of the general economic conditions of the nation. It has been only natural that the demand should become insistent for better transportation, due to the tremendous industrial expansion and the needs of workers to reach their destinations on schedule.

Practically all of the present passenger cars are for official use, and even these have been used only when the errand was one of haste or to such points where the trams made no contacts. The officials of the Avtodor confidently predict that the Soviet Union will be fully motorized with a network of bus lines within the next ten years and possibly within five.

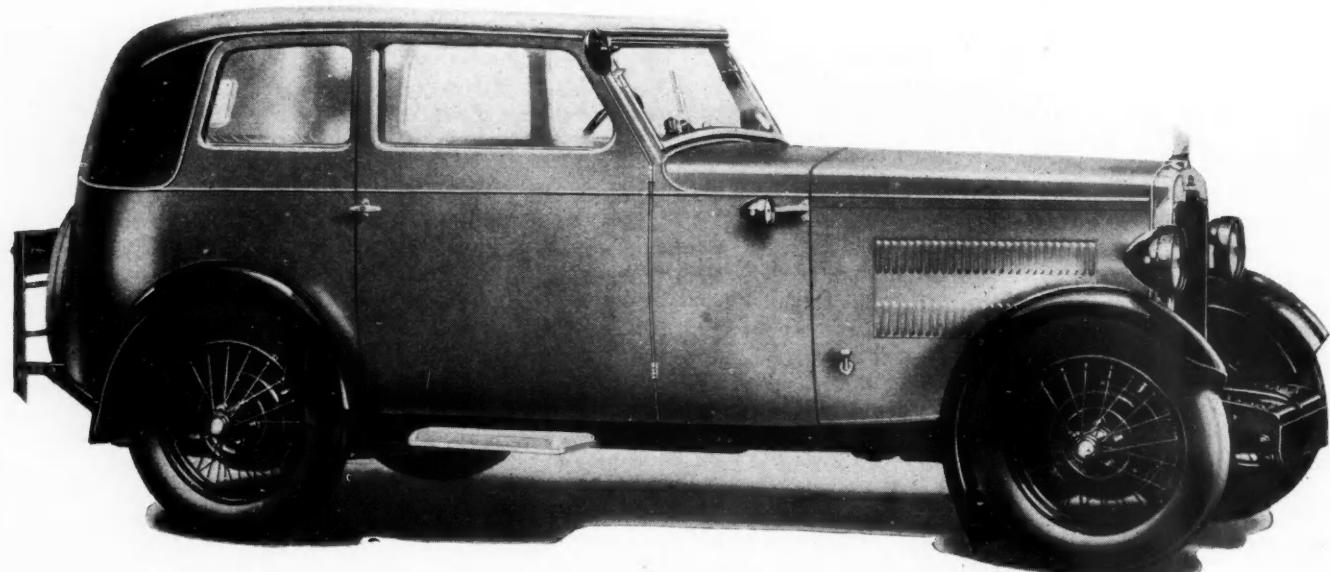
Rover Introduces Light Six

THE Rover Co. of Coventry, England, has introduced an additional 1930 model termed the Light Six, which has the same power unit as the Two-Liter Six. The new model has a smaller and lighter chassis with a road performance proportionately better. It is to be supplied with one type of body only, a Sportsman's Saloon, the price being £325 for the standard model, or £355 for the "regal" rendering, which includes numerous additional items of equipment, such as vacuum servo brake operation, safety glass, bumpers and furniture hide upholstery.

The body is fitted with two wide doors and four win-

dows, and is of Weymann fabric construction with adjustable bucket seats in the front and additional leg room provided at the rear by the floorboards being set in a well. As the accompanying illustration shows, the windshield has a pronounced slope, while a feature is the provision of bicycle-type fenders for the front wheels, being attached to a large circular back-plate secured to the stub axle. Another point of note is the absence of full-length running boards, a relatively short step being provided at each side.

Rover prices in general have been advanced slightly, though the increases range only from £1 to £5.



The Rover Light Six Sportsman's Saloon

Welding Society's Research Work Covers Basic Principles

Results of investigations by professors of technical colleges and men connected with industrial laboratories were presented at the recent meeting of the organization in Cleveland.

THE American Welding Society last year decided to stimulate and give financial support to research work on the fundamentals of welding. A Committee on Fundamental Research was organized, under the chairmanship of H. M. Hobart of the General Electric Company and at the fall meeting of the Society last year a conference was held with representatives of colleges equipped to do such research work. Projects are now under way at nine different institutions and negotiations are being carried on with several others. The first fruits of this program appeared in the form of papers on the fundamentals of welding which were presented by research workers at the recent meeting of the Society.

In conjunction with the investigation by the institutions, a similar line of endeavor was carried on by men connected with industrial laboratories. Some of these papers, not only those of purely research nature, but also those of direct practical interest, are given in abstract herewith.

Chemical Reactions in the Carbon Arc

CHEMICAL reactions in the carbon arc have been investigated in the Welding Laboratory of Lehigh University, and a record of these experiments was presented in a paper by Chester E. Doan, assistant professor of physical metallurgy, and E. Ekholm of the Research Department of the Aluminum Company of America.

The experiments showed that with arc lengths greater than $\frac{1}{4}$ in. and with welding currents up to 300 amperes, no carbon is absorbed by the weld. Any hardening of the weld attending good industrial practice, which has been noticed in the past must, therefore, be attributed to some other cause such as (1) actual physical contact between the incandescent carbon tip and the molten weld metal or to a very short arc length or (2) to the rapid chilling of the molten weld metal by the relatively cold member in which the weld is made, resulting in a hardening heat treatment accompanied by high internal stresses.

Since carbon is vaporized at the arc, a vapor envelop rich in carbon surrounds the electrode tip. At the high temperature, the carbon burns rapidly in air and forms, first, an envelop of carbon monoxide gas, then an envelop of carbon dioxide gas, both probably concentric with the electrode tip. Outside both these envelops is an atmosphere of highly heated ordinary air containing carbon dioxide gas.

Considering that under somewhat similar conditions in the carbonizing process low-carbon steel absorbs carbon rapidly, it might be expected that the weld metal

would be carbonized. The tests, however, showed a carbonizing action only with very short lengths of arc when the sputtering weld metal actually came in contact with the carbon electrode. It is therefore concluded that the essential action of the carbon arc as used industrially is one of oxidation of the weld metal; that a $\frac{1}{4}$ in. arc length is sufficient ordinarily to avoid all carbonization of the weld, and that the permissible arc length is, within limits, independent of the current. No superiority of graphitized carbon over hard carbon, with respect to hardness of the weld, was shown in these experiments. A partial if not complete graphitization of a high carbon electrode is produced, of course, by the intense heat at the tip of the electrode while it is in use, and this may account for the fact that the two qualities behaved similarly.

Metallic Arc Weld Studies

H. M. BOYLSTON, professor of metallurgy at Case School of Applied Science, presented a paper on "A Metallographic Study of Some Metallic Arc Welds," prepared in collaboration with A. Jenkin and A. C. Carpenter. The methods of welding employed in the experiments on which the paper was based is that known as the Slavinoff, in which the filling material is supplied by the metallic electrode, as the latter is melted by the heat of the arc, and is carried by the arc to the metal which is being welded. This process of welding is in reality a continuous process of melting, filling (or casting) and cooling, all at a relatively rapid rate. It is not surprising, therefore, that the microstructure of the melted and cast filling metal should show the characteristic features of a steel casting, albeit one that has been cooled fairly rapidly through the solidification range, through the granulation zone (the zone between the solidification range and the thermo-critical range), and the thermo-critical range itself. In case two beads are laid down, one over the other, there would, of course, be a modification of this structure, the heat from the second bead acting to anneal the metal in the first bead and produce a very fine grain structure such as is usually found in the base metal not far from the weld when a single bead is laid down.

This experimental work on which the paper was based was limited to six different welding conditions, as follows:

1. Normal amperage and temperature, as determined by previous experience and experiment in the welding industry, using a short arc (Series NS).
2. Normal amperage and temperature, using a long arc (NL).

3. High amperage and temperature, using a short arc (HS).
4. High amperage and temperature, using a long arc (HL).
5. Low amperage and temperature, using a short arc (LS).
6. Low amperage and temperature, using a long arc (LL).

Some results obtained and conclusions reached were as follows: In every case the area of deposited metal was greater with the long arc and with the high temperature arc.

A short arc appears to produce a stronger weld irrespective of the temperature. The ductility (as measured by the bend test) is lower with the short arc when using normal arc temperature, but higher with the short arc when using high or low arc temperature.

The difference in the tensile strengths of the welds produced due to a change from a short to a long arc is only half as great at normal arc temperature as at either high or low arc temperature. The combination of a short arc and high arc temperature appears to give the greatest ductility and to permit of the highest working stresses.

Some of the tests indicate that welding results in a lowering of the tensile strength by 12 to 24 per cent. In this connection it should be remembered that in commercial welding there is always a substantial bead of weld metal left which thickens the weld area more than enough to make up for the weakening of the weld metal itself. It is seldom that a properly welded material breaks in the weld itself when tested in a tensile testing machine.

The long arc apparently produces greater porosity in the deposited metal than the short arc.

All of the welding conditions used in the experiments produced a considerable amount of "nitride needles" in the deposited metal, of varying size and quantity depending upon conditions.

With either normal or high temperature, a long arc produces a coarse grain structure both in the weld metal and the adjacent base metal. When using low arc temperature the long arc has less effect in coarsening the structure.

Using the short arc, the highest arc temperature produces fewer nitride needles and less mottled structure, while the lowest arc temperature produces broader needles and more of them than either of the other arc temperatures.

Using the long arc, the normal arc temperature appears to produce the coarsest grain structure and the largest number of needles, with somewhat less of the mottled structure than is produced with either high or low arc temperature.

There was no sign of coarsening of the grain structure (as compared with the unaffected base metal) due to welding heat. In fact, there was a considerable grain refinement in the base metal fairly close to the weld area.

Weld Testing by Stethoscope and X-Ray

Carbon Research Laboratories, have developed methods of non-destructive testing of welds applicable to plate, pressure vessels, pipe joints and structural steel joints. The method consists essentially in first detecting by means of the stethoscope, the presence of any spots in

A. B. KINZEL, C. O. Burgess and
A. R. Lytle, all of the

Union Carbide &

the weld that are different in character from the satisfactory weld, and second, in obtaining X-ray photographs of these spots so as to determine the seriousness of the deviation from normal. The method of applying the X-rays is said to be novel and was suggested by Dr. Ancel St. John of the Union Carbide & Carbon Research Laboratories several years ago.

Simplified Bend Test for Welded Joints

In the efforts to make welded work stronger and more reliable, much attention naturally is being given to testing methods. The actual strength of welded joints is determined by means of tension tests, while the ductility of the weld is generally arrived at by means of a bend test. A simplified bend test for welded specimens developed by A. B. Kinzel of the Union Carbide & Carbon Research Laboratories, was described in a paper by Francis G. Tatnall, manager of the Testing Equipment Division of the Southwark Foundry & Machine Co., Philadelphia.

The specimen is slightly bent at the end outside the testing machine, and is then bent back upon itself in the compression side of the same universal testing machine which is used for the tension tests. Fiber elongation can be measured by the change in the distance between gage marks on the specimen, and Mr. Kinzel has devised a little hand extensometer by means of which the proportional elongation, in per cent, of the outer fibers can be read off directly.

From the strain (fiber extension) the stress can be readily calculated by multiplying by the modulus of elasticity, which for steel may be taken at 30,000,000. With modern strain gages, Mr. Tatnall asserted, fiber stress can thus be determined to within 500 lb. p. sq. in., which is quite close.

Mr. Kinzel also has developed a portable tensile testing machine of 40,000 lb. capacity. It is similar to a small oxygen cylinder in shape, size and weight, and can be transported and handled in the field as readily as the latter, yet it is said to be quite reliable. It is of the hydraulic type and forms a self-contained unit with built-in pump. Load readings are taken on a dial gage of improved design. This dial gage, of the Bourdon-tube type, is carried in a separate box and screwed into the machine. The specimen, which may be either cut from actual welded work or may be one of the sample welds periodically made by each welder, slips readily into the little grips, the fingers being used to spread the jaws. Pressure is then pumped up by working the pump handle; the gage pointer then rises on the pressure scale and a red "maximum" pointer remains in position to indicate the load under which the specimen broke.

"Nitride Needles" and Their Properties

A PRELIMINARY report on an investigation concerning the nature of so-called nitride needles was made by P. P. Alexander, research engineer of the General Electric Co. When photomicrographs of weld metal are taken they frequently show numerous straight, needle-like dark sections, which are generally believed to be due to nitride formed by the combination of iron with nitrogen from the air. One reason for calling them nitride needles is that similar formations are found in steel nitrided with ammonia. As a rule, when the weld metal shows these needles the weld is brittle.

Mr. Alexander has made welds in atmospheres of argon, nitrogen, argon mixed with some oxygen, air, carbon monoxide and hydrogen. One-half of the samples were annealed in air and the other half in hydrogen, the latter so that no nitrogen could reach the weld metal during the annealing process.

These results suggested the following explanation of the nature of the needles. It is believed that they are not due to nitrogen, but to oxygen, and are, in all probability, an iron-iron oxide eutectic. This contamination with oxygen can occur either during the welding, if the surrounding gas contains oxygen, or during the long annealing in air. The welds produced in pure argon or nitrogen are perfectly free from needles, yet the addition of oxygen in both cases immediately produced the characteristic needles. Moreover, welds produced in carbon dioxide and pure oxygen or carbon monoxide all contain a large amount of needles.

The discussion showed that welding engineers are not quite ready to give up the idea that these needle-like formations (which in reality are of flake form) are due to nitrogen. The investigation is to be continued and a more detailed report is to be made later.

Automatic Arc Welding of Thin Sheets

W. L. WARNER,
General Electric
Co., in speaking on

automatic arc welding of thin sheets, said joints made by the fusion-welding process will develop at least 85 per cent of the strength of the sheet.

The sheets to be joined are placed with edges butted together where the weld is to be made, and clamped to a suitable backing device. An arc is then struck between edges and is maintained while being moved continuously at the proper speed from one end of the joint to the other, fusing the two edges together. Copper bar stock is usually employed for the backing bar; it prevents the welding metal from running through, and it also gives assurance against its sticking to the backing member, because of the high heat conductivity of the copper.

The rapid local heating of the sheets at the arc causes expansion in all three planes. Owing to this expansion, the edges will begin to move apart after the arc has moved about one-third the way down the

seam. To prevent this, the seam is usually first tack-welded at both ends. But if two strips, for instance, are first tack-welded and then seam-welded as described, and the work is removed from the machine immediately after completion of the welding operation, it is found to be curved longitudinally. If the work is left in the clamp until cold this distortion will be reduced. Drums or boxes thus welded do not show this distortion.

Another cause of trouble in connection with such welds is the magnetic blow. The arc tends to blow forward when the seam is started and for a certain distance from the start, and it tends to blow backwards over a similar distance near the end of the joint. This instability of the arc may prevent fusion and cause porosity and an unevenly welded joint.

To prevent trouble from magnetic blow, the General Electric Co. now provides an auxiliary magnetic field neutralizing that due to the arc. The work is held in place by a pair of copper jaws, the copper chill bar and the corners of the steel strips used in building up the bar. Below the chill bar is an insulated conductor through which flows a part of the welding current, and the magnetic field due to this current neutralizes that due to the arc. To render this control effective, it is necessary to so place the insulated conductor that the magnetic controlling field is caused to travel over part of its path, through the work and across the seam.

The author said he considered $\frac{1}{4}$ in. as the border line between thin and thick stock, all stock below that thickness being welded by a single arc. Sheets as thin as No. 18 gage can be welded by this process. Among the automobile parts welded by the process are muffler tubes and rear axle housings. In the former case, No. 18 stock is welded at the rate of 30 in. p. m. while the axle housing is of $\frac{3}{16}$ in. stock and the weld penetrates about two thirds of the thickness, insuring oil tightness and adequate strength.

The discussion centered mainly on means for overcoming the effects of magnetic blow. One member said that after tacking the sheets the welding electrode should be held at an angle in the plane perpendicular to the sheets and through the seam, so as to make an obtuse angle with the seam, and after a short length had been welded the electrode should be swung forward, which would reverse the direction of the magnetic blow and correct its previous effects.

Operators Assail Expert's Taxation Thesis

(Continued from page 436)

And further: "Commercial motor transportation (does he mean common-carrier transportation?) is compared as a business with the other businesses of manufacturing, farming and merchandising, and the inference is drawn that the first should contribute *as a business* to the general revenue fund in the same manner as the latter three. In what manner are these latter taxed as businesses?"

Participating in the discussion, Edward F. Loomis, secretary of the Motor Truck Committee of the National Automobile Chamber of Commerce, declared: "Special taxes on trucks and buses have been mounting rapidly during the last 10 years and are now reaching levels in some states so high that some marginal operators are being forced out of business.

"While the average tax per passenger automobile in the United States is \$22 a year, the average tax per motor truck is more than twice as much, or \$50," Mr.

Loomis asserted. "Furthermore, common carrier trucks must pay 14 times as much as the private automobile, or \$303 a year, and buses pay 24 times as much, or \$512 a year.

"Owners of motor vehicles are paying over \$800,000,000 a year in taxes, large share of this is contributed by the owners of commercial vehicles as compensation for their use of the highways. Further study of the proper share of each type of motor vehicle as well as of proper contribution by the public as a whole, toward meeting the nation's highway bill, is needed. Further sharp increases in truck and bus taxes without careful analysis may unfairly penalize thousands of shippers and travelers dependent upon commercial motor vehicle transportation."

The convention did not approve the majority of minority report and it was understood that studies by the committee would be continued for another year.

Landis Semi-Automatic Cam Grinder Is Completely Motorized

One operator can run three or four machines on work which requires accuracy and high finish. Main drive is of constant speed type with work at variable speed.

THE Landis 5 in. x 40 in. semi-automatic hydraulic cam grinder was developed to enable one operator to run three or four machines, where close accuracy and finish must be high.

Although the machine is referred to as being semi-automatic it is in fact full automatic after the grinding cycle for the first cam on the shaft has begun. The operator simply dogs the shaft, places it in the machine, throws the quick-acting work rest jaws into position, starts the work rotating by moving a convenient lever and lastly throws the main control lever.

With the throwing of the main control lever the work carriage moves, bringing the first cam to the grinding position, at which point the latch on the front of the bed drops into the first notch of the hardened notched plate on the front of the carriage. Immediately the oil pressure is cut off from the carriage traversing cylinder, and oil enters the hydraulic straight infeed cylinder, causing the wheelbase to feed in rapidly while at the same time the oil pressure is reversed in the work-cradle cylinder, causing the cradle to swing back until the master cam comes in contact with the roller. By this time the grinding wheel has come into contact with the work, and the speed of the feeding-in movement slows down to the predetermined grinding speed; it

continues to feed in at this speed until the wheelbase comes against a positive stop, indicating that the work has been ground to size. Shortly before the end of the cut the work-speed automatically slows down, but the fast work-speed is again resumed as soon as the cam is finished.

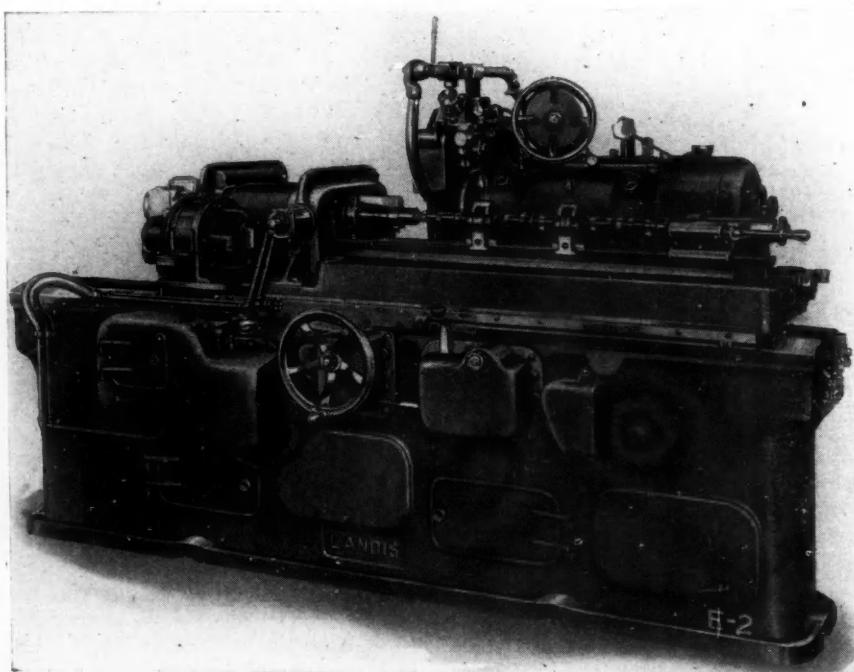
The first cam having been ground to size the timing cam makes one complete revolution, so that it trips the latch, causing the wheelbase to move backward to its starting position. The cradle swings forward and the table traverses, bringing the second cam on the shaft to the grinding position, where it stops as the latch enters the second notch in the notch-plate. As the table traverses, bringing the second cam to grinding position, the master cam roller automatically indexes on its shaft, so as to bring it in line with the second cam on the master. From this point on the cycle of operations is exactly the same as with the first cam on the shaft, and this is automatically repeated for each cam, including the fuel pump cam, if used.

After the last cam on the shaft is finished, the wheelbase moves to its extreme backward position, the work-cradle swings away from the roller, and the carriage moves a short distance, throwing the main control lever. In this manner all movements are stopped, except work rotation, which is necessary for the operator to stop, prior to unloading the machine.

Work of a high degree of accuracy and a very satisfactory finish is said to be turned out with this machine consistently as a result of the accurate timing of the grinding cycle, the slow-down work-drive motor control and the great weight and rigidity of the machine.

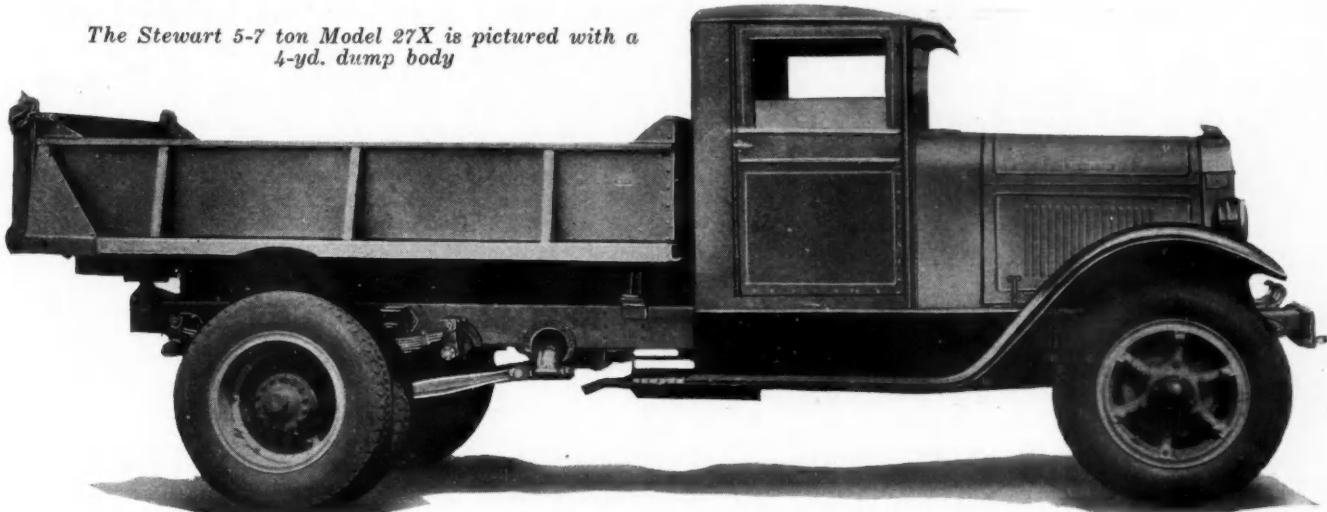
The machine is completely motorized and self-contained. Two motors are used, the main drive motor being 15 hp. and the work-drive motor $\frac{1}{2}$ hp. The former is of the constant-speed type, while the latter is of the variable speed type. Provisions have been made for mounting a D. C. generator on the machine in case direct current is not available in the user's plant. The net weight is 10,000 lb. including both motors, and the machine will be known as a 5 in. by 40 in.

The machine is being marketed by the Landis Tool Co. of Waynesboro, Pa.



Landis semi-automatic hydraulic cam-grinding machine

The Stewart 5-7 ton Model 27X is pictured with a 4-yd. dump body



Stewart Announces Seven-Ton Truck With Four-Speed Transmission

*Range of load capacity of the company's line is increased
by the addition of Model 27X priced at \$5,700 and
powered by a six-cylinder Waukesha engine.*

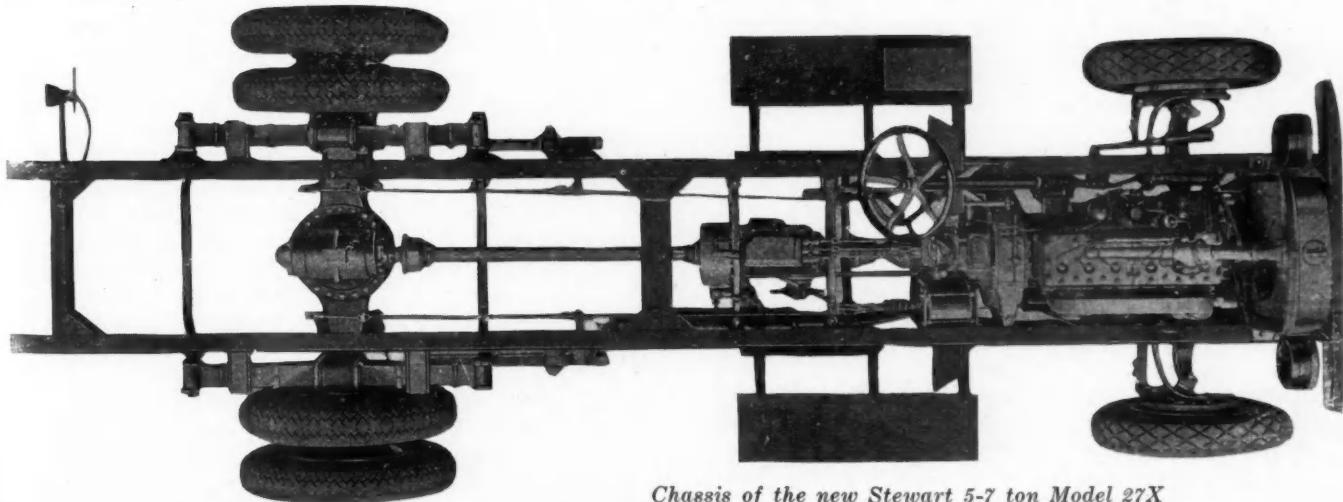
RANGE of capacity of the truck line of Stewart Motor Corp. has been increased by addition of Model 27X which is rated 5 to 7 tons, priced at \$5,700 for the chassis. The engine is a six-cylinder Waukesha with 4 $\frac{3}{8}$ in. bore and 5 $\frac{1}{8}$ in. stroke, mounted in rubber both front and rear. The transmission is a dual unit, consisting of a two-speed auxiliary bolted to the bell housing of the engine and a four-speed center unit, mounted in rubber, like the engine. The rear axle is a Timken full-floating worm type, rated at 25,000 lb.

The standard ratio of the rear axle is 10 to 1. Engine to wheel ratios with the auxiliary in low are: first 93.8 to 1; second 47.3 to 1; third 29.2 to 1; fourth 21.8 to 1. Auxiliary in high range gives ratios of 32.1 to 1 for first, 16.2 to 1 in second, direct in third and 7.5 to 1 in fourth. Reverse ratios are the same as corresponding first gears.

The radiator, which is mounted on rubber, has cast top and bottom tanks. The side members and the top tank are polished aluminum. The radiator core is composed of vertical tubes with cooling fins. Circulation is controlled by a thermostat.

There are four universal joints on standard models, a Spicer 2 $\frac{5}{8}$ in. tubular shaft being used from the transmission to the rear axle and a short shaft between the auxiliary and main transmissions. On long wheelbase models an intermediate shaft and joints are incorporated in the drive line.

Brakes are of the four-wheel mechanical type with vacuum booster, the latter being mounted on right side of clutch housing. Rear brakes are 21 by 3 $\frac{3}{4}$ in. with two pairs of shoes, each pair operated by a separate brake lever, but the four levers are moved in unison by the brake hook-up. Front brakes are 17 $\frac{1}{4}$ by 3 in.



Chassis of the new Stewart 5-7 ton Model 27X

Just Among Ourselves

Timely Price Cuts Benefit the Industry

NASH and Packard got a good hand from C. A. Vane, general manager of the National Automobile Dealers Association, in his last bulletin, for the frank price cuts which were made in connection with the cleaning up of stocks of old models recently, preparatory to the announcement of 1930 lines. Several other manufacturers have done this same thing on various occasions in the last year or so, and the general effect, in our opinion, always is such as to benefit everybody, from the factory through to the consumer.

Replacement of special inside trading allowances by open price cuts in cleaning up stocks of old models has been urged in these columns for several years back. Consequently, it is inevitable that we join with Mr. Vane in his approval of the current moves. It is hard to get around the fact that trading allowances help to give the public a wrong idea of the value of used cars and thus help complicate just a little more an already acute problem.

* * *

Basic Marketing Methods Improving

THERE are still enough merchandising variables in the automotive marketing scheme to cause the industry to be looked upon with suspicion by the public. Cars pictured in advertisements adorned with various equipment items not included in the f.o.b. price listed in the same advertisement; inside trading discounts, which constitute a price cut without any price cut being made evident frankly to the buyer; arbitrary markups of delivered prices by dealers which can be analyzed by the buyer only if he fights for information as to what is included; these and other methods still are used frequently as means of

taking advantage of a particular merchandising situation, even by men and companies who believe them to be fundamentally opportunist in character.

Rome wasn't built in a day and it is pleasant to note that basic automotive marketing methods each year seem to become more clean cut, more logical and more fair from whatever standpoint they may be viewed. The substitution of price cuts for trading allowances seems to be another step in the right direction.

* * *

Men and Ideas Must Conform to Constant Change

JUST as a constant flow of water is needed through a swimming pool if the pool itself is not gradually to become unfit for the use for which it was designed, so a complete though gradual change of ideas is essential in an automotive factory organization every so often. The ideal situation would be for the change to come about gradually as it does in certain well-regulated swimming pools, where some new water is coming in all the time and some old water is going out all the time; the change is taking place without the current swimmers being particularly conscious of it.

In the automotive organization, carrying the simile a bit further, either ideas or men can be compared to the water. If the minds of the men making up the organization can be brought to a fluid state so that their ideas are constantly undergoing modification in the light of changing conditions, then the water in that particular automotive pool can be changed constantly with a minimum of change of personnel.

* * *

Mental Flexibility Has Permanent Financial Value

SUCH mental flexibility, unfortunately, is exceptional

rather than common, and in the past it has been the exceptional rather than the common organization that has been able to keep up with the times in this efficient and painless manner. Too often the process has been as follows: a group of men go into an organization; they make it successful under existing conditions; conditions continue to change; they try to make the new conditions conform to their previously successful methods; they fail inevitably; then a fairly complete reorganization takes place and another set of new men go through the same cycle.

Increased mental flexibility on the part of individual executives and emotional as well as mental recognition of the fact that business conditions are and always will be in a state of constant change are the things that seem likely to be of greatest permanent financial value to any automotive organization which is building for the future. . . . And so far as we know nobody yet has discovered any quick working formula which will achieve such flexibility and recognition.

* * *

Human Interest Promised in 1929 Production Issue

ONLY two weeks now until the publication of the big 1929 Production and Factory Equipment Issue of *Automotive Industries*—Oct. 12 is the date. While it is devoted almost exclusively to the newest developments in the automotive production field, we think we are safe in saying that there will be a kick in it for every subscriber. Incidentally, it will carry a cable report of the Paris automobile show. This year we are promising human interest along with more practical information than ever before. After it's out we'd like to know if you enjoyed it.—N.G.S.

Machinability Tests of Metals Give Almost Concordant Results

Determinations have variations peculiar to the several types of tests, O. W. Boston, professor of shop practice, University of Michigan, states in research report to A.S.S.T.

EXTENSIVE investigation of the machinability of various metals has been carried on during the past year at the University of Michigan with the object of discovering whether different methods of machinability determination give corresponding results. While it was found by O. W. Boston, professor of shop practice at the University, who conducted the research, that results of the tests agreed in general exceptions peculiar to each type of test were evident.

Professor Boston's findings, together with reports on three other research projects containing points of interest for shop and foundry executives in automobile manufacturing plants, are presented herewith in abstract. These reports were contained in papers presented at the technical sessions of the American Society for Steel Treating during the National Metal Congress held in Cleveland from Sept. 9 to 13 inclusive.

Experiments with Machinability

O. W. BOSTON, professor of shop practice at the University of Michigan, reported on tests

carried out to determine the machinability of various metals, the specific object being to find out whether various methods of machinability determination give concordant results. The measurements made bore on the following:

1. Brinell, Rockwell and scleroscope hardness.
2. The force required in the direction of cut to move a planer tool of given form and dimensions.
3. The torque and thrust required to move a $\frac{1}{4}$ -in. high-speed steel twist drill ground to a given form.
4. The penetration of (or the distance traveled by) a $\frac{1}{4}$ -in. twist drill per 100 revolutions at a given speed and under a given dead load.
5. The energy absorbed by a single-tooth milling cutter of the side-cutting type (similar to a cutting-off tool) of given dimensions, at given feed and speed.

Dynamometers were developed for measuring the force applied and the energy expended in the various operations, and tests were made on 18 ferrous and 21 non-ferrous metals and alloys.

In general, each of the tests for machinability applied gave results which agreed with those of the other tests. However, the force on a planer tool appears to be the most reliable indication of the cutting qualities of a metal, as equal forces were consistently found for like materials. Unfortunately, the equipment for this test is expensive, and the execution of the tests is slow. One deficiency of this test pointed out is that it gives no indication of the observed fact that drill penetration in gun

metal is slow. The Brinell test also gave no indication of this.

The results obtained by measuring the torque on a drill while cutting offers good evidence as to the cutting qualities of the metal. The resulting thrust varies in almost direct proportion to the torque and, therefore, is also an indication of the cutting resistance of the metal.

While consistent results may be obtained throughout a number of tests on a single specimen by the single-tooth milling cutter used in an impact type of machine, results from a number of steel specimens do not compare favorably with the results of other methods of tests on the same specimens. This may be due to the fact that the cutting quality of these materials changes with the type of cut and thickness of chip. The milling cutter, for instance, does not cut to full depth at the start, but rather slides over the surface till enough pressure is developed between the material and cutting-tool edge to cause the edge to dig in. There appears to be no information available to explain the relation between such cutting action as a function of the chemical analysis of the specimen or its make-up as influenced by heat treatment. The milling test is quick and inexpensive, however.

While the Brinell number varies almost directly with the Rockwell number and the ultimate strength of the steel in tension, shear and compression, its relation to the cutting force, energy, torque, thrust, or penetration of steel or non-ferrous metals seems remote.

The drill penetration test is simple, quick and inexpensive to make. As a rule, the greater the penetration in a given time for a specific number of drill revolutions, the lower the power required. The difficulty of grinding the test drills makes this method very uncertain, particularly where the drill must be reground between one test and another.

Quenching of Steel in Hot Aqueous Solutions

H. J. FRENCH, of the International Nickel Co., and F. E. Hannvill, of the Bureau

of Standards, described experiments on the quenching of steel in hot aqueous solutions.

Surface and center cooling curves were obtained on cylinders of 0.96 per cent carbon steel, $\frac{1}{2}$ in. in diameter and 2 in. long, when quenched from 1605 deg. Fahr. into water, 5 per cent sodium hydroxide, 5 per cent sodium chloride solutions and two proprietary quenching oils at different temperatures between 68 and 212 deg. Fahr. The liquids were all moving at 3 ft. p. s.

Increase in temperature lowered the cooling speeds,

and increased the cooling times in water and the aqueous solutions, but the changes were smaller between 68 and 140 deg. Fahr. than between 140 and 212 deg. Fahr. Exactly opposite effects were produced in the center cooling by the two oils, but the changes were relatively small throughout the entire temperature range, 68 to 212 deg. Fahr.

As the temperature of the aqueous solutions approached the boiling point of water, the cooling at the surfaces of the cylinders became more irregular and the cooling rates at low temperatures around 390 or 570 deg. Fahr. became more rapid than at intermediate temperatures around 570 to 930 deg. Fahr. or at higher temperatures. However, smooth center cooling curves were obtained in water at temperatures up to and including 140 deg. Fahr., or the 5 per cent solutions of sodium hydroxide or sodium chloride up to 176 deg. Fahr.

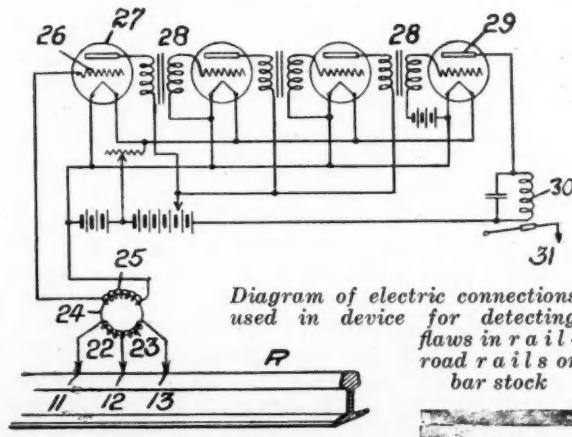
These characteristics suggested the possibility of using the hot aqueous solutions to bridge the gap in cooling rates between water and the customary quenching oils at ordinary temperatures. The following were selected as the most promising of the liquids tested and are given in order of decrease in average cooling speeds (increase in center cooling times) over the range 1605 to 390 deg. Fahr. 5 per cent NaOH at 68 deg. Fahr.; 5 per cent NaCl at 68 deg. Fahr.; water at 68 deg. Fahr.; 5 per cent NaOH at 140 deg. Fahr.; 5 per cent NaCl at 140 deg. Fahr.; water at 140 deg. Fahr.; 5 per cent NaOH at 176 deg. Fahr.; 5 per cent NaOH at 185 or 194 deg. Fahr.; the two proprietary oils at 68 to 212 deg. Fahr.

Not all of these would be classed as good coolants for practical heat treatment, but the results seem to justify the view that the hot aqueous solutions should, with further study of concentrations and circulation, ultimately provide a useful set of coolants having speeds intermediate between water and oils at atmospheric temperatures, at least in the hardening of small pieces of steel.

Testing Railroad Rails for Flaws

A METHOD of testing railroad rails for flaws was described by Elmer A. Sperry, president of the Sperry Development Co., Inc., Brooklyn, before the A.S.M.E. at Cleveland last week. It is based on the effect of such flaws as transverse fissures, inclusions, etc., on the electrical conductivity of the rail in the direction of its length. Since the method may possibly be applied also to the location of similar defects in bar stock, it is briefly described here, by references to a diagrammatic illustration.

The main primary energizing current is made to



traverse the rail, or a section thereof, by main brushes in contact with the track. Intermediate between these brushes are located three searching brushes 11, 12 and 13, shown in the diagram. These are connected to two opposite primary coils 22 and 23, constituting the primary of a transformer 24. These coils are oppositely wound and produce opposite magnetic excitation of the transformer. All variations in the primary current will be picked up by the two outer brushes, and thus be completely neutralized as to their influence on the secondary 25, but in passing along the track, when a fissure occurs between one end brush and the middle brush the first coil 22 will become excited to a greater extent than the other. The transformer will become active and in the secondary will be induced half, say the positive side, of a sine wave curve, but in the next instant the fissure passes between the middle and the rear brushes, giving an opposite excitation to the secondary, completing the alternating wave by adding the negative side. We now have a true alternating wave. This wave then passes to the amplifiers and may be examined as to both its magnitude and characteristics, but it will be seen that any amount of variation in the primary exciting current can in no way reach the secondary, and therefore its effects are entirely neutralized.

Reclaiming Non-Ferrous Scrap

FRANCIS N. FLYNN of Milwaukee presented before the Institute of Metals a paper on "Reclaiming Non-Ferrous Scrap Metals at Manufacturing Plants." Up to about five years ago (he said), much of the factory scrap was sold to secondary metal smelters, receiving little or no preliminary treatment. Of late years, the salvage department has become an important part of industrial plants, reclaiming everything of value, and incidentally doing much of the work formerly done by the smelters. The author expressed the view that much of the work done at the factory with inexperienced men could be done to better advantage by experienced skilled labor at the custom smelting plants.

Employees of the salvage department collect waste products in all departments at the source and in that way avoid much contamination. All reasonable precaution is taken to keep the scrap clean. It is hand-sorted, cut, burned, magnetized, concentrated, separated or compressed, as the case may be, preparatory for re-use in the plant or sale to others.

Copper, tin, lead, zinc, aluminum, antimony and nickel are the principal metals in automobile manufacturing. Large tonnages of copper and tin are used in the bronze foundry, copper and aluminum in the aluminum bronze foundry, yellow brass strip and solder in the radiator department, tin in the babbitt department, antimony and lead in the battery department, and copper wire for electrical parts.

The manufacturers' aim is to re-use the clean scrap by the simple process of melting rather than smelting. Most of this work is carried out in the foundries on the night shift to avoid interference with production work on the day shift. The kettles or furnaces that are used for making production castings are used for melting the reclaimed scrap metals. The capacity of the kettles varies from 1 to 20 tons, whereas that of the melting furnaces varies from $\frac{1}{2}$ to 1 ton. The melted scrap is poured into pig molds for re-use when and as required.

THE FORUM

Petroleum Research Sought

Editor, AUTOMOTIVE INDUSTRIES:

If the question were put to any chief executive of any reputable automobile factory—are you giving full consideration to the possibilities of new materials?—the answer would be always an emphatic yes. In general such an answer would be true, but in most cases not as wholly true as the speaker would believe.

Our present position with respect to alloy steels, high carbon steels, non-corrosive and high tensile non-ferrous alloys, cellulose paints and many other important factors in the betterment and cheapening of the automobile, has been reached by close cooperation between the automobile manufacturer and the raw material supplier. Without such cooperation not nearly as much would have been done.

Leaving out the operation and maintenance of an automobile, considering only its manufacture, petroleum products play an important part. Every manufacturer expends large sums in the purchase of oils, fuels, solvents and many other petroleum derivatives, yet in general—there are some notable exceptions—the manufacturer is more than reluctant to cooperate with the refiner. In fact it is not in any way overstating the case to say that the automobile industry as a whole exercises a restrictive influence on improvements in oil refining.

Specifications Are Old

Temporarily leaving gasoline out of the picture, most of the specifications on which oils and other petroleum products are purchased for consumption in automobile plants could have been written 20 years ago. Many of the specifications in use today are almost as old as that, and the products that have to be supplied to meet those specifications are old-fashioned likewise. Purchasing on specifications of this sort means that a manufacturer's yearly expenditure is far greater than it needs to be.

The petroleum industry is itself largely to blame for this curious situation. The properties of products, especially lubricating oils, have often been deliberately wrapped in mystery. Wild and extravagant claims have been made for brands of oil which on laboratory examination and actual use proved to be new only in name. Refiners with a crude supply restricted to a particular type have tried to make virtues of necessities. Merchandising methods, designed to appeal to the individual motorist, have been brought to bear on commercial fields where they are totally unsuitable; but back of all this confusion and misdirected effort is the fundamental problem as yet unsolved, of how petroleum specifications should be written.

To write specifications for steel that will insure certain qualities is an almost exact science, yet every time a new kind of alloy has appeared it has had to have special study and right at this point is where the consumer and supplier have cooperated so helpfully. With oil, the writing of specifications is never better than an inexact approximation and right here is where the consumer in general strongly resists the appeal of the refiner with a new idea. Yet despite this reluctance in cooperation I cannot recall a single instance where oil specifications, once modernized, have failed to give satisfaction to the consumer.

Promises Induce Skepticism

Let us look at a different phase of the situation, a very different phase. When an automobile manufacturer gets into trouble with the *performance* of his product, due to faults or novelties in its design, he is far from hesitant in appealing to the refiners to help him out with special products. And here, too, the refiners have been guilty of poor judgment in that they have often claimed an ability they did not possess; made promises they could not perform and so induced skepticism the next time they offered something new and really good.

To give an example, the average motor bus engine wears out much faster than it ought because it is not properly lubricated. It is not properly lubricated because the oil gets much too hot, because no oil known will lubricate properly at such temperatures. Mechanical means for cooling the oil in circulation are essential and must come. The delay in their appearance is due to overconfidence in the sales departments of oil companies. "Of course this is a hard job to lubricate but we can give you an oil 100 per cent satisfactory." So the engineer hopes it is true and saves a few dollars on the first cost of his chassis, and who shall blame him?

To give the other side, suppose a production manager is in trouble with the machining of some new alloy, he is very likely to appeal to the engineering service of an oil supplier to come in and suggest something. In this way new cutting lubricants of great value have been discovered and huge economies resulted. Or again, it is unquestionable that centralized chassis lubrication is destined to become as universal as the self-starter and it is equally certain that this is half a mechanical and half a petroleum problem. The basic requirements for a chassis oil are different from those of any other lubricant used in automobiles, but even here the refiner is usually being asked to make special products to fit a particular mechanism and a lot that could be done to fit mechanisms to available oils is being neglected.

Broadly speaking, however, automobile engineers and the technologists of the oil industry understand each other pretty well, but they have both devoted altogether too much time to considering special cases; freak difficulties, overcome by freak or emergency materials. This is natural enough because such problems are interesting and often urgent, they stimulate the inventive faculty the exercise of which is always a delight to any technical mind. But such cases do not save the automobile industry any money on the lubricants, the process oils and the other forms of petroleum of which it is an enormous purchaser.

There are, however, signs of change. Some of the very largest units of automotive manufacture have opened their specification books and permitted the influx of modern oil products thereby getting better supplies at lower prices. Perhaps the spectacular things done with gasoline this past few years is leading to an increasing faith in the potential abilities of refiners. Let us hope so, because millions of barrels of oil are being refined by wasteful methods to meet specifications which have been out of date for years, and it is the automotive industry as the principal consumer that is footing the bill for that waste.

Very truly yours,

A. LUDLOW CLAYDEN,
Chief Technologist, Sun Oil Co.,
Philadelphia, Pa.

September 16, 1929.

Suggests Inventors' League

Editor, AUTOMOTIVE INDUSTRIES:

I read your editorial in the issue of the 17th concerning the position of the inventor with great interest. I have given this question some thought. I have also had some opportunity of seeing the question from both sides of the picture. Part of my present job is to examine all inventions sent in to the Wright Aeronautical Corp. so that I see it from the business side as it pertains to a corporation.

I come from a somewhat inventive family and have lived with and worked with inventors so that I know something of their temperaments and psychology.

The problem of the inventor gaining a fair return is very complex. You advise that he become a good business man first. This is sound advice, but is not apt to solve the problem. The chances are that should an inventor attempt this it would result in his becoming a poor inventor. The two qualities of mind are almost diametrically opposed. They rarely coincide—the two outstanding cases being perhaps Edison and Westinghouse, and even there I have always felt that business ability overshadowed inventive genius, popular beliefs notwithstanding.

The problem of independent inventors not employed by corporations might possibly be solved in the same manner as that of the authors and dramatists has been solved by the Authors' League: the standardized contract, able legal advice and selling codes. The temperaments of authors and inventors is quite similar and they both suffered from lack of business ability—they could not sell what they had created.

I have visualized a similar Inventors' League with adequate engineering talent in the various fields, good legal talent, good commercial talent, and *very good SALES* talent. If such an organization could be made

to work it would save industry from a needless flood of useless inventions, and would save the inventors the expenditure of a great deal of time doing work which has already been done, or that should not be done, as there is no market for it. The financing of such an organization would be difficult, but it would almost pay industry to do it in the long run.

The problem of the inventor employed by a corporation is more difficult. It is of course not to the advantage of a corporation to have one of its inventors a good business man. Incidentally if he were this happy combination, he would probably be out for himself. To this end some companies require that in consideration of employment, the inventor sign an agreement that whatever he invents belongs to the corporation. The inventor receives a nominal sum and the patent expenses are paid by the corporation. In this way a corporation may become possessed of patents which are outside its field and the idea may never come into use through neglect. Again it may own by this manner very valuable patents which are its life blood. In the first case the inventor gets only the nominal sum, \$25 or less usually, and in the other a chance of a salary raise or some interest in the proceeds if the corporation is magnanimous.

There is a third case of an inventor getting a good idea, and the corporation not agreeing to go ahead with the patents as it does not believe the idea to be worthwhile. By his contract the inventor cannot patent it himself and someone else comes by the idea and goes ahead with it. Should he patent it himself the corporation could in all likelihood preempt it under the contract.

It is a difficult problem and I think that corporation executives should give it more thought. Although inventions are not as close to the money as sales, or finance, they are very often the source of income for an entire industry.

It would seem as if the modern tendency of corporations was to "kill the goose."

Very truly yours,

ASHLEY C. HEWITT,
Essex Fells, N. J.

August 19, 1929.

Indicator Tests Questioned

Editor, AUTOMOTIVE INDUSTRIES:

The writer has been much interested in the article by Mr. De Juhasz in your July 27th issue wherein the statement is made "These tests are believed to be the first in which indicator cards have been taken with a car in actual operation on the road."

The writer respectfully refers to your issue of July 10, 1926, wherein Mr. Heldt has a short article with illustrations. Also there was some comment in the "Just Among Ourselves" column concerning road tests made with my high-speed multi-cylinder engine indicator on June 2, 3 and 4, 1926. I will call attention to the fact that the diagrams were obtained from ALL cylinders of the engine under test rather than from just one. There were also comments and illustrations in the June, 1926, issue of the *S.A.E. Journal* concerning these road tests. The writer would appreciate very much if you would give this matter an airing to the end that we might determine who actually did take the first indicator diagrams on the road. I expect that it was attempted more

or less successfully a number of years ago and I think that we should get as accurate information as possible.

Yours respectfully,

H. M. JACKLIN, B.S., M.E.,

Purdue University.

Automotive Industries challenged Mr. De Juhasz concerning the statement referred to by Mr. Jacklin in the above letter before publishing his article. It afterwards was mutually agreed that the statement should be printed to evoke, if possible, definite information as to when and where the first indicator diagrams were taken on the road.—Editor's Note.

Neon Light Properties

Editor, AUTOMOTIVE INDUSTRIES:

On Aug. 17, 1929, there appeared in your publication an article under the heading "Neon Lights Used as Fog Beacons Have No Unique Features," which article was based on the results obtained from tests conducted by the Bureau of Standards. It is unfortunate that your paper should take the attitude that there are no "unique features" in neon. The fact is that tests definitely prove that neon lights have a better fog penetration per watt of power supplied to the lamp. Tests were made in comparing a red incandescent lamp and neon lamp, both having the same candlepower.

If the Bureau of Standards would have taken the wattage reading of the red lamp to produce the same

candlepower of the neon lamp, they would have discovered some very surprising results, in fact the amount of wattage supplied to the red incandescent lamp must have been five or six times that of the neon lamp to produce the same horizontal candlepower.

The question of fog penetration resolves itself into which lamp gives the best fog penetration for the minimum amount of power or cost of operation.

The Claude Neon Companies have never claimed that the red rays from a neon lamp were different than any other red rays, but what we have claimed was that the red rays penetrate fog and that the use of neon lamps is the most efficient method for producing these red rays.

In our laboratories we have conducted comparative tests between incandescent lamps with red filters and neon lamps. The following tabulation speaks for itself:

	Incandescent (with filter)	Neon
Beam Candles	200,000	200,000
Wattage of Lamp	1,000	125
Life of Lamp	100 to 500 hr.	2,000 to 5,000 hr.

We feel that a lamp that can produce the same red beam candle as a 1000-watt incandescent lamp and only consume 125 watts of power and also have a life 20 times the life of the incandescent lamp certainly has unique features.

Yours very truly,

LEO BECK, Chief Engineer,
Claude Neon National Laboratories,
Long Island City, N. Y.

August 22, 1929.

Ward Drop-Frame Delivery Truck

AN "easy-access" truck for house-to-house delivery has been developed by the Ward Motor Vehicle Co., Mount Vernon, N. Y. Like all of the vehicles of the Ward company, it is propelled by current from a storage battery. The frame, as may be seen from the photographic view of the chassis, is built up of structural steel members on two levels, the forward and rear portions being joined at about the middle of the length by large gussets. Thus the floor of the driver's compartment is on a level with the running boards. Two body types have been designed for this chassis, one holding 40 and the other 50 to 55 cases of milk bottles, the vehicle being designed primarily for house-to-house milk delivery. We understand that 30 of these vehicles have been placed in service by the Borden milk firm in New York and 100 have been ordered by the same firm for service in Chicago.



Ward electric delivery truck for the house-to-house milk service

The vehicle in general follows established Ward practice. Both axles are of Timken make. A single 5 hp. motor is used, of either General Electric or Westinghouse make; it is mounted amidships and drives the worm-gear-type of rear axle through a propeller shaft with Spicer universal joints.

The controller is of the Ward-Westinghouse type with magnetic contactors, and is operated by a master drum on the steering column. It has a continuous capacity of 125 amp. Arcing is confined to a single type of electrode, which is quickly and easily replaced. A grid resistor of heat-resisting alloy is furnished, which is used only when starting and during transition periods.

The chassis without battery has a weight of 2475 lb. and the total loaded weight rating is 7250 lb., this including the chassis, battery, body and load. The speed of the vehicle is given as from 10 to 14 m.p.h.

Revised Federal *Airworthiness Code* *Increases Margin of Safety*

Plan of cockpit, powerplant detail, fire resisting design and wing specifications for airplanes are outlined in Department of Commerce Bulletin.

By A. B. CROFOOT

NEW airworthiness requirements, made effective the first of September by the Department of Commerce, outlining the specifications which must be met in an airplane receiving an approved type certificate, have taken a decided forward step in assuring the flying public of the utmost safety in construction and design of the ships used by commercial carriers. These new requirements were worked out by department officials in cooperation with representatives of the Aeronautical Chamber of Commerce of America, and it is through the courtesy of the latter body that *Automotive Industries* is enabled to outline for its readers the changes between these new requirements given in Aeronautical Bulletin 7A and the former requirements given in Bulletin 14. The printing of this bulletin by the government has been completed, but as it is not ready for immediate distribution the chamber has mimeographed for its members the text of the new bulletin and has indexed the changes incorporated.

Among the general regulations included in the new pamphlet, which are either added to the old or represent changes from the old, are requirements of a blanket nature covering all tests. The department now requires only one copy of stress analyses, for example, instead of two as formerly. The affidavit stating the number of planes constructed is required semi-annually instead of quarterly. The strength of ribs, control surfaces and systems and the shock-absorbing qualities of landing gears must be demonstrated in the presence of a department inspector. This

was formerly optional. Tests on wood members must be carried to destruction and the parts which fail must be subjected to tests as to their physical properties.

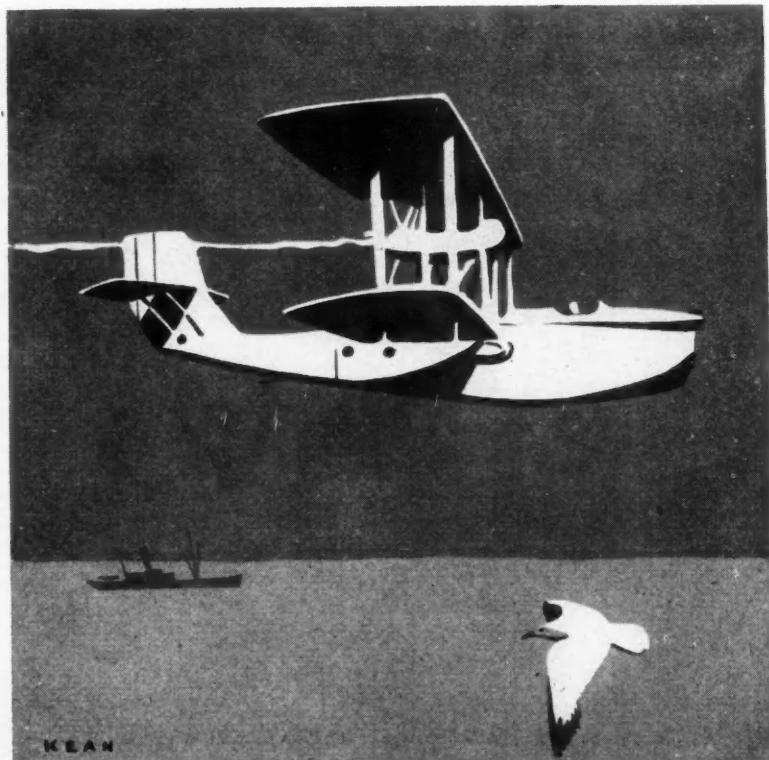
When it is planned to change an engine in a ship for which an approved type certificate has been granted, application must be made for a new certificate. With this application must be submitted data including the drawings showing the new engine mount and stress analysis, a drawing of the powerplant installation and three view drawings of the plane on a sufficiently large scale to determine its general specifications.

Specifications as to cockpit requirements are considerably more detailed. The cockpit must afford suitable ventilation and vision for the pilot under normal flying conditions. The pilot and the primary control units, with the exception of cables and rods, must be located so that no portion lies between the plane of rotation of the propeller and the surface generated by a line passing through the center of the propeller hub and making

an angle of 5 deg. forward or aft of the plane of rotation of the propeller.

The passenger cabin must have one exit for every six passengers instead of two as heretofore, and none of these shall be in the plane of rotation of the propeller. With the exception of the main door, these exits may all be classed as emergency exits.

Considerable more detail as to powerplant installation is included in these new requirements. The plant itself must be of an approved type, and must be installed so as to reduce to a minimum any chances of failure. Fuel tanks



of Licensing Requirements

must be installed as far from the engine as is consistent with structural considerations, stability, length of fuel lines and safety. They must not be installed in any enclosure where fumes can accumulate. These tanks, together with oil tanks, must have a large factor of safety against shock and vibration. Where they have a capacity of over 10 gal. they must be fitted with internal baffles. Fuel tanks must be able to withstand an internal pressure of 4 lb. per sq. in. without leaking and 3 lb. per sq. in. without permanent distortion. Tanks must be made of materials, which, together with their normal impurities, will not react chemically with fuels or oils.

There shall be a fire wall between the engine and the rest of the aeroplane. With water-cooled engines this wall shall be of terneplate, galvanized steel or asbestos aluminum. Aluminum or aluminum alloy may be used with air-cooled engines. Such openings through this wall as are necessary, shall be as small as possible. Wherever possible, members passing through this wall shall move either axially or torsionally. Structural members adjacent to this wall, where constructed of inflammable material, shall be insulated and the insulation shall be protected from oil or gas absorption. There must be a space of at least 1 in. between this wall and fuel tanks.

Fuel feed shall be either by gravity or mechanical pumps, air pressure pumps being strictly ruled out. Where mechanical pumps are used there shall be also an emergency hand pump. Fuel lines shall be of seamless tubing, preferably of copper, with wall at least .032 in. thick. Lengths of line shall be continuous between fittings and mounted so as to minimize vibration. They shall be at least double in capacity the size required for normal flow for full engine power. All bends shall have an inner radius of at least three times the outer diameter of the tube, and shall follow a smooth curve. Any flexible tubing used for connections shall be of the minimum length consistent with their purpose and shall be metal lined.

The fuel system shall have drains which shall be readily accessible and shall be located so as to drain the system completely when the ship is in normal resting position on the ground. These shall drain

clear of all parts of the ship and shall be equipped with safety locks to prevent their accidental opening. The line to the engine shall contain one or more strainers in positions readily accessible, and there shall be no rubber connection between the final strainer and the engine carburetor. There shall be an emergency line cutting off the first of the main strainers. There must also be one or more positive, quick-acting shut-off valves within easy reach of the pilot.

All passenger planes must be equipped either with a reserve fuel tank or with an indicator to show the amount of fuel in the main tank. Where fuel feed is by gravity the tank should be so located as to permit ready flow of the fuel to the engine when the ship is flying at its steepest climbing or gliding angle.

The cowling should be so arranged that it will be easy to note the accumulation of dirt around the engine and should be fitted with a drain which will drain it completely in normal flight or at rest on the ground. It should be of such shape and construction as to confine any fire breaking out in the engine to the one locality. Separate drains are to be provided for the carburetor, the strainer, pumps and all other parts of the fuel system liable to leakage. These drains shall lead clear of all parts of the ship and shall be so located as to prevent dripping on any part of the structure, fabric or on cellular material of any kind. Filler caps should also be located where there will be no drip on any part of the plane. Filler caps must be plainly marked and made fast to the tank.

The carburetor air intake must be located outside the cowling unless the emergence of backfire flames is positively prevented. This intake must be air-tight and should be provided with a drain. Exhaust manifolds shall be located preferably outside of the cowl as far away from the carburetor intake as is consistent with construction. It should be so located that the exhaust will not blow back where it would endanger the plane nor should the exhaust fumes be permitted to blow back over the pilot or passengers. It shall also lead back to a position where it will prevent any glare ahead of the pilot.

The lubrication system shall be adequate to the needs of the engine. Oil tanks must be capable of withstand-



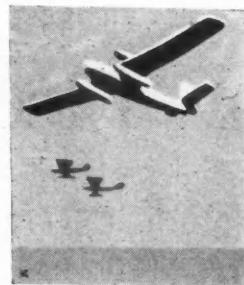


TABLE I

Gross Weight	Factor for Landing Conditions	Height of Drop for Design of Shock Absorber (in.)	Average Loads per sq. ft. on Horizontal Surfaces (lb.)	Ailerons and Vertical Tail Surfaces (lb.)
Less than 2,500	6.5	24	30	75% of load required on horizontal surfaces
2,500-5,000	5.6-5.5	24-22	30-25	
5,000-15,000	5.5-4.9	22-20	25-20	
15,000-25,000	4.9-4.5	20-18	20	
Greater than 25,000	4.5	18	20	

Values for gross weights in between those given should be interpolated.

ing an internal pressure of 5 lb. per sq. in. They must be vented and must have a capacity to outlast the maximum capacity of the fuel supply. Pipes should be of seamless metal, annealed, and shall have no sharp bends. These pipes should be of continuous section between connections. They shall have a diameter equal in size to the engine oil inlet or outlet connections. Connections shall be of a type satisfactory to the Department of Commerce. The complete system shall have a drain which is readily accessible and which will drain it completely in normal positions of flight and at rest. This drain also shall lead clear of all parts of the plane structure and shall be equipped with a safety lock.

Adequate Cooling System Required

The cooling system shall be adequate to the engine requirements. Radiator fastenings shall be such as to reduce vibration and strain to the minimum. In water-cooled systems, wherever practicable, the piping should be of metal but must not transmit vibration or strain to the radiator. When rubber piping is used it shall conform to accepted standards and shall have at least three plies of fabric. If rubber tubing extends any length more than twice its diameter it shall be supported to prevent collapse. All fittings shall be beaded and clamped according to accepted standards. The cooling system shall be drained similarly to fuel and oil system drains. The cooling system shall have a capacity adequate for cooling the engine as long as normal fuel supply would indicate.

The throttle and ignition control must be readily accessible, and in multi-engined planes it should be so arranged as to control each engine separately or all of them simultaneously. Throttle control shall not be by wire. These controls must be plainly marked.

Propeller clearances have been changed in these new requirements and for land planes the propeller must clear the ground by at least 9 in. instead of 6 in. as formerly. In seaplanes the clearance shall be 18 in. Propellers shall be designed and adjusted so as to limit the power of the engine at full throttle to 105 per cent of its normal rated speed.

There have been some changes made in performance tests which are to be run in still air with full load at sea level. Land planes must be capable of landing at a speed not greater than 60 m.p.h. Landing speed shall be figured as equal to the calculated stalling speed at sea level. All heavier-than-air machines must be capable of climbing at least 400 ft. in the first minute. Land planes shall be capable of taking off within 1000 ft. The tests shall prove these planes capable of flying around two pylons or buoys 1500 ft. apart making five successive figure eights at 500 ft. altitude without varying more than 200 ft. in altitude. These turns shall have a radius not exceeding 250 ft. for planes of gross weight of 5000 lb. or less, 350 ft. for planes of gross weight from 5000 to 15,000 lb. and 500 ft. for all others.

Flight test specifications have been further expanded

to demonstrate the longitudinal balance of the ship and to prove that the ship is stable lengthwise laterally and directionally. These tests must demonstrate that there is no undue tendency to spin and must prove the ability to recover from a six-turn spin in not more than one and one-half additional turns with the controls in neutral and the power shut off. There must be no back pressure on the control column nor any tendency toward flutter when the ship is in the spin.

These requirements are not applicable to planes of more than 4000 lb. gross weight unless conditions indicate that these tests are advisable.

Definitions of weights have been incorporated in the new requirements as follows: The gross weight is equal to the weight of the empty plane plus the total fuel capacity, the total oil capacity, crew and payload. The empty weight shall include everything over and above the items mentioned in the previous definition. The weight of gas shall be calculated at 6 lb. per gallon, oil at 7½ lb. per gallon and 170 lb. each shall be allowed for passengers and crew. Useful weight is defined as gross weight less the empty weight. Special provision is made for granting approval where rated gross weight is not sufficient to include all of these on the following bases:

- (a) With a payload of at least 200 lb. and 10 per cent of the useful load.
- (b) Where the fuel capacity is .15 gal. per hp. and oil is sufficient for the fuel.

Where special approval is granted a placard naming the conditions under which the plane can be operated must be plainly posted in the ship.

Load Factors for Seaplanes

The flying factors for flying boats, amphibians and seaplanes of less than 5000 lb. gross have been changed and a reduction of 10 per cent in load factors is now permitted. The load factor chart for high angle of attack has been enlarged to include ships up to 25,000 lb. gross weight as indicated in Table I.

Landing conditions and landing load factors for skis shall be the same as for floats. All types of shock absorbers now have the same landing load factors. Certain types were formerly allowed reduced factors.

The relative efficiency of biplane wings is to be determined by use of a formula which has been published in Aeronautics Bulletin No. 14 and which is incorporated in this bulletin as an appendix, instead of from curves which were permitted before.

Specifications for wing loading computations have been considerably expanded and special means for calculating wing loading where wings are raked have been added. If a wing is raked more than 15 deg. with rear spar shorter than the front, the wing load should be calculated on this new basis. If the wings are internally braced, or if the outer bay is so large as to include no point of inflection, wing loading may be calculated according to existing rules for internally braced wings,

assuming the tip of the wing to be at the end of the front spar. If wings are externally braced the normal load W and the stresses for design inboard of the outer point of inflection in the outer bay shall be calculated by existing rules for externally braced designs, assuming the wing tip to be at the outer end of the rear spar. For this part, let M_0 equal the bending moment at the outer strut point and S_0 equal shear just outboard of that strut. Assume a load curve varying as a straight line from W at the outer strut point to $0.8W$ at the outer end of the front spar. For the portion outboard of the strut let M_1 equal the bending moment at the outer strut and S_1 equal the shear just outboard of this strut. For the design of the portion of the spar between the outer point of inflection of the outer bay and the interplane bracing meeting at the outer strut point multiply the bending moment by specified inboard loading by the ratio M_1/M_0 and the shears, reactions and axial loads by the ratio S_1/S_0 .

A new paragraph has been added specifying that the auxiliary airfoils on slotted wings shall be designed for a load of 75 lb. per sq. ft. acting forward and upward at right angles to the chord whether the slot is open or closed.

Fixed Tail Surfaces

For wings tapered in thickness ratio reduction in air forces or dead weight per square foot is no longer allowed unless adequately demonstrated pressure distribution or similar data are submitted to substantiate the assumptions. Specifications on fixed tail surfaces have been changed to require that the forward 20 per cent of these surfaces must be capable of carrying twice the normal fixed surface load.

Load requirements for the control system have been reduced. These surfaces shall be capable of meeting 125 per cent of their calculated design load or shall conform with the following specifications, whichever is the greater: They shall have a load capacity of 200 lb. on a control stick or 100 lb. on diametrically opposite sides of a control wheel, acting fore and aft, shall have a load capacity of 75 lb. on a stick or a moment of 75 times the diameter of the steering wheel, acting in a lateral direction. The rudder control will have a load capacity of 200 lb. at the point of contact with the pilot's foot. These loading requirements must be demonstrated by static tests with full design load.

A paragraph has been added describing requirements for boat hulls and seaplane floats. These shall be so built that when the ship is landing the propeller axis will be horizontal and can

be assumed as supported by a vertical buoyant force distributed over the area extending from the step forward halfway to the forward end of the normal load water line. This latter shall be assumed as rectangular and should be as wide as the bottom of the float at the step. The load should be distributed in intensity so that it is 50 per cent greater at the keel than at the chine and 50 per cent greater on the section at the step than on the forward section.

Prismoidal Curve

The volume of prismoidal loading curve for computation of these intensities shall be eight times the gross weight of the plane. This volume $8W = 25/16 a b L$ where W is the gross weight of the plane, a is the intensity of the loading at the chine at the forward section, b is the beam and L equals one-half the length of L W L forward of the step. The centroid for this loading shall be assumed as on the keel at $8/15 L$ from the forward edge of the load and the resultant water reaction shall pass through this and through the center of gravity of the ship. Forces representing the weights of and in the ship shall be parallel to the water reaction.

When the ship is floating, loads shall be computed on the assumption that the hull is floating on a trochoidal wave whose length is equal to the normal load waterline and amplitude is $1/20$ its length. Investigation shall be carried on with the hull supported between two wave crests. When the hull is so shaped that the part back of the step may develop appreciable buoyancy the wave length shall equal the overall length instead of the normal load waterline length. The center of buoyancy must be approximately under the center of gravity of the ship. The hull shall then have a load factor of three based on the ultimate strength of its materials.

As an alternative to this method of testing the hull when floating, it may be approved on demonstrating that it will support the following forces without failure or buckling when supported at the strut fittings: An upward load at the bow equivalent to 75 per cent of the portion of the weight normally carried by the float; a similar upward load at the stern; an upward load at the step equivalent to twice the portion of the weight normally carried by the float. The bottoms of the float shall be capable of withstanding a force of 8 lb. per sq. in. between the step and the section 25 per cent forward of the step, and a force of 4 lb. per sq. in. between the section 25 per cent forward and the section 75 per cent forward of the step, a force of 4 lb. per sq. in. between the first and second step, or if



only one step is used, a force of 4 lb. per sq. in. to the section 50 per cent aft of the step. The bow must be designed in such manner that consideration be

given the possibilities of striking floating objects.

The section defining wing rib tests has been amplified. Wing ribs must be tested to destruction. For wings of high or medium angle of attack, the total load carried by the rib W must equal $F W_0 S$. Where W is the total load required, F is the load factor for the condition in question, and is considered as half the sum of the high and low angle factors for medium angle loading condition, W_0 is the normal gross load per sq in. on the wing, and S is the maximum rib spacing in inches. If wings are tapered, let W_g be the average gross load and S the rib chord multiplied by half the sum of the distance to adjacent ribs, figured in feet. For high angle loading condition where the rib is more than 60 in. long, 16 loads shall be applied to the rib at the following points, the sum of loads to equal W as computed above: 1, 3, 5, 7.3, 9.9, 12.9, 16.2, 19.9, 24.1, 28.9, 34.2 40.4, 47.5, 56.5, 72 and 90 per cent of the chord length. If the rib is less than 60 in. long, eight loads shall be applied to produce shears and moments corresponding to those applied for the longer rib.

If more convenient, the United States Navy High Incidence Rib Loading System may be used instead for this computation. For the medium angle of attack loading condition the test should be as above excepting that the loads should be placed as follows: 8.34, 15.22, 19.74, 23.36, 26.6, 29.86, 33.28, 36.9, 40.72, 44.76, 49.22, 54.08, 59.5, 65.8, 73.54 and 85.7 per cent of the length. United States Army Medium Incidence Rib Loading System may be used as an alternative in testing ribs for this condition.

Chord Loads

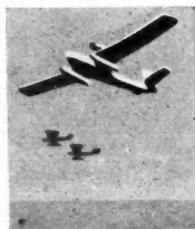
For ribs of small depth where the lacing passes entirely around the rib, all loads should be applied at the bottom chord. For ribs of greater depth where lacing passes through the rib, 75 per cent of the load should be applied at the top chord and 50 per cent to the bottom chord, the total required load being 125 per cent of that required for ribs of small depth. The portion of the ribs between the leading edge and the front spar shall be able to withstand the high angle loading condition loads in the reverse direction. For testing, ribs shall be attached to spars exactly as in the completed plane, except that no glue shall be used. At least two ribs must be tested for either loading condition, and the tests showing the lowest results used as a criterion.

A completely new section has been added on requirements for light aircraft, that is, craft with power loading of more than 30 lb. per horsepower, or heavier-than-air craft without any powerplant. This section is designed primarily to cover the construction of gliders. Unless otherwise specifically covered in this section, the general requirements for this type of craft will be the same as for ordinary airplanes. Such powerplants as are included in this group are regarded as auxiliary, and for that reason no special requirements are mentioned for the powerplants, outside of the fact that they shall be nearly as fireproof as possible. The use of propellers on this type of aircraft being also largely auxiliary, they are not subject to any special



Size	Rated Strength—lb.
No. 6-40	1,000
No. 10-32	2,100
1/4-28	3,400
5/16-24	6,100
3/8-24	8,000
7/16-20	11,500
1/2-20	15,500

Rated strength of tie rods.



requirements.

Wing design loads will be based on performance characteristics computed or tested for each individual aircraft. Velocities cor-

responding to all angles of attack of the wings will be plotted on a curve similar to that given herewith, plotting the various velocities from 0 and neglecting the effect of any powerplant. Points representing the extreme ends of these velocity vectors are joined by a faired curve. Velocities can be obtained by computation if the airfoil characteristics, parasite drag and stabilizing forces are known. Free flight and wind-tunnel tests may be used in assisting to establish velocities.

Wings must be checked for strength under the following conditions:

- Maximum velocity (when the craft is in nearly vertical dive). The required load factor for this condition shall be 1.5.
- The foremost center of pressure location for wing airfoil (when the ship is in the attitude of minimum speed) shall have a load factor $F = .25 \left(\frac{V_{\max.}}{V_{\min.}} \right)^2$
- Maximum velocity corresponding to a gliding path slope of 1 in 6. The load factor for this condition $F = \left(\frac{V_{\max.}}{V_{\text{path 1 in 6}}} \right)^2$
- Wing structure must be able to carry these load systems reversed in direction with load factors one-half the values given above.
- For resistance to loads in handling and wing tip loadings the structure must be capable of carrying the plane with load factor of 2, when reactions are applied at the wing tips in a transverse plane through the center of gravity. In all cases the stress analysis will be made by taking the wing airfoil vector in the correct location and by applying reactions corresponding to those set up by the tail load and weights carried by the wings. Tips shall be capable of carrying their portion of the load with a margin of 30 per cent.

Balancing Factor in Tail

Horizontal tail surfaces must be strong enough to balance the loads of wing structures with a 30 per cent margin. These surfaces must have a loading factor of not less than 6 lb. per sq. ft. Vertical tail surfaces shall be at least 75 per cent as strong as the horizontal tail surfaces. Ailerons shall be as strong as the horizontal tail surfaces.

No approval will be granted to planes which are controlled by shifting the pilot's weight. Lateral control may be effected in this manner if the craft is sufficiently stable to respond readily to the shifting of the pilot's weight and if the pilot can recover his normal position readily no matter in what position the plane may be flying. The control stick shall be strong enough to carry the maximum air loads on the control surfaces.

The fuselage tail structure shall be strong enough to carry the tail loads and balance wing loads. The fuselage shall have a factor of 5 for landing conditions.

If the covering is attached by any unusual method, it must be demonstrated as having strength adequate to

the demands that will be made upon it. If any unusual material is used for covering, it must be submitted for test to demonstrate its strength. These tests will be performed on a section of the wing and on a section of the horizontal control surfaces.

If the glider is to be towed, either manpower or some form of automotive power may be used. If automotive power is used, cable shall be attached to the glider in such a manner that it may be readily released by the pilot. The towing cable must not be more than two-thirds as strong as the maximum wing structure design load. Gliders shall be equipped with a safety belt to withstand a pull of 850 lb., or the weight of a 170-lb. man with a load factor of five. They must also carry some means of indicating when the glider is approaching stalling speed.

Flight Tests for Gliders

Gliders shall be flight tested to demonstrate that they are stable longitudinally, laterally and directionally. They must also demonstrate that they respond satisfactorily to controls. The air tests will be used to check the velocity diagram already mentioned. They must be tested fully loaded to demonstrate that they can dive at an angle of 30 deg. below the horizontal for a sufficient length of time to develop maximum velocity without any objectional flutter.

New requirements give a simplified least work method of calculating loads in lift truss wires which are not parallel. The following formulae are used in this calculation:

$$P_1 = \left(\frac{V_1 A_1 L_1 L_2^3}{V_1^2 A_1 L_1^3 V_2^2 A_2 L_2^3} \right) B$$

$$P_2 = \left(\frac{V_2 A_2 L_1^3 L_2}{V_1^2 A_1 L_1^3 V_2^2 A_2 L_2^3} \right) B$$

Where B = beam component of load at this joint.

P_1 = load on wire 1.

P_2 = load on wire 2.

V_1 = vertical length component wire 1.

V_2 = vertical length component wire 2.

A_1 & A_2 = areas of respective wires.

L_1 & L_2 = length of respective wires.

Drag struts are now required to be attached to spars in such a manner as to reinforce the spars against torsional failure.

Where wings are covered plywood, the department will permit the assumption that this covering carries a shear due to the chord components of external loads. Extra provision, however, must be made to carry the compression between spars. These regulations recommend that plywood web compression ribs properly rein-

forced be used. Spars must be investigated for axial loads imposed by the chord loads.

If the covering is rigidly attached it can be assumed to carry 10 per cent of the moments on the wing due to the beam components of the air loads. Spars are designed to carry 90 per cent of this. If the covering is removable, or any portion of it can be opened, proper reduction in its assumed strength must be made at that point. There will be no reduction in shear loads carried by the spar.

Allowable bearing strength of bolts in wood have been changed to accord with recent "Forest Products Laboratory" tests.

A paragraph has been incorporated requiring tie rods in primary structure to be of minimum size No. 6-40. Single-strand hard wires in primary structure shall be of minimum size No. 13 (.072 in. diameter).

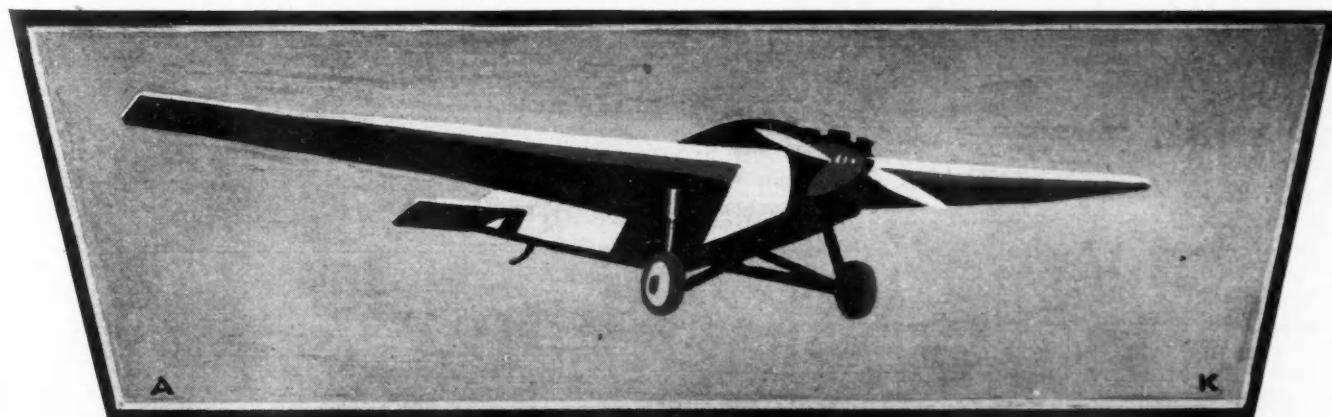
A table has been incorporated giving the rated strength of various size tie rods (Table II).

The paragraph dealing with the bearing pressure on control systems is outlined in considerable more detail. The maximum allowable bearing pressure on control surfaces hinges shall be equal to 1/2000 of the ultimate bearing strength of the softest material used in the hinge. The maximum allowable bearing pressure on joints subject to angular motion in control systems operated by pushpull rods or tubes shall be equal to 1 per cent of the ultimate strength of the softest material used in the joint.

Securing Certificates

Procedure for securing approved type certificates have been outlined as follows:

The flight test and conversion of test results must be made under the supervision of a responsible engineer who will certify to an affidavit. The department will recognize for consideration performance data obtained in accordance with the methods outlined in "A Manual of Test Flight Procedure," Bulletin No. 9, Department of Engineering Research, University of Michigan (Reference No. 1). An alternative for this method is contained in "Engineering Aerodynamics" (Ronald Aeronautical Library). All altitude data will be given with reference to the "standard atmospheres" tables contained in "Standard Atmosphere Tables and Data," Advisory Committee for Aeronautics Report No. 218. As many or as few as desired of the quantitative data referred to in Reference No. 1 may be submitted for approval. When items of performance not listed in Reference 1 are desired to be approved, the data submitted must substantiate the soundness of the method used. No qualitative determination of performance shall be considered as eligible for approval.



NEW DEVELOPMENTS—Automotive

Coke-Fired Core-Oven Heater

WHEN coke is used for heating foundry ovens it is usually burned in a brick furnace directly beneath the oven. The hot gases from the combustion chamber are led through brick flues extending the length

of the oven and discharged upward through vents in the oven floor. The gases entering the oven through these floor vents are circulated in the baking chamber and then discharged to the stack, either by natural draft or by an exhauster.

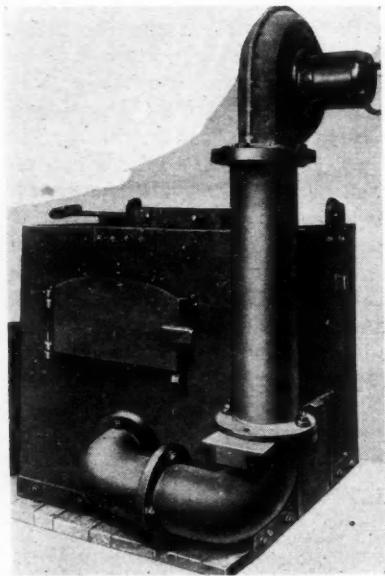
Fuel is fed to the furnace from a firing pit, the floor of which is about 6 ft. below the level of the foundry floor. Occasionally a mechanical stoker is used to feed the furnace, but hand-firing is the predominant method.

A unit oven heater, built under Mayor patents, is now being offered to foundry men by Young Brothers Co. of Detroit. It is claimed to be more compact and efficient than other types of furnace used in connection with kiln-type foundry ovens. It is a box-type of self-contained furnace, built of fire brick and encased in cast iron, and is placed alongside the rear or side wall of the oven at floor level. Placing it at floor level eliminates the need for making an excavation for the installation; the long flues of the old type of furnace are eliminated, and further economies result from the more compact form of the unit heater and the consequent reduced amount of brick work required in its construction.

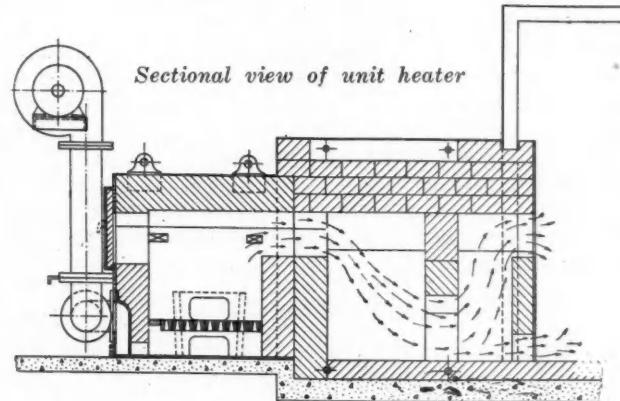
The unit heater is supplied with air by a blower in its air intake line. As a result, the baking chamber is at a pressure slightly above, instead of below, atmospheric pressure. As the blower handles the air at room temperature, lubrication of its bearings offers less difficulty than does that of the bearings of an exhaust fan.

The principal claim made for the unit heater is that of increased fuel economy, and this seems to be based on the reduced wall area of the unit heater and the consequent reduced opportunity for heat radiation. With respect to this the manufacturers furnish us with the following information:

In a very extensive test recently conducted on an installation in one of the large Eastern foundries on Young Brothers insulated steel panel ovens, equipped with the unit heater, the gross output of perfectly dried molds was found to be 154 lb. per pound of coke used. This is an increase of approximately 233 per cent in output per unit of fuel consumed over the old brick



Young Brothers unit heater
for core ovens



ovens which were replaced by the present installation. The new ovens also have an increased baking capacity of 40 per cent over the old ovens per square foot of foundry floor space used.

The operation of this unit heater may best be explained by giving the routine of operation of the oven on which the tests referred to above were made. The oven was a Young Brothers two-compartment mold drying car type unit of insulated steel panel construction. Each compartment was 15 ft. wide, 26 ft. long and 12 ft. 9 in. high, and it accommodated two 12 by 12 ft. mold cars. An oven load consisted of 50 tons gross. The baking temperature was 750 deg. Fahr. and the total amount of fuel for the bake 650 lb.

When the oven load was rolled in, a fire was started in the unit heater. Wood, waste or other quick burning kindling, saturated with kerosene, was used to ignite the coke. The fire was lighted at 5.15 p. m. and was refueled at 45-minute intervals until 10.45 p. m., when the blower was shut down and no further fuel added. The temperature was then allowed to decrease until the load was withdrawn at 6.15 the next morning.

The baking temperature of 750 deg. Fahr. was reached in 2 hr. 35 min. after the fire in the heater was started. It was then held at 750 deg. until 10.45 p. m. When the load was removed the following morning, the oven temperature still registered 500 deg. Fahr. so that during the 7 1/2 hr. from the time the draft was shut off the temperature dropped at the rate of only 33 1/3 deg. per hour.

Roller Bearings for Aircraft

NORMA-HOFFMANN BEARINGS CORPORATION, Stamford, Conn., has brought out a new series of roller bearings known as the Type RXLS which is particularly adapted for use in aircraft work. It corresponds in outside dimensions with the same firm's XLS series of ball bearings. The bores of these bearings are unusually large with respect to the outside



Sectional view of Norma-Hoffmann RXLS roller bearing

Parts, Accessories and Production Tools

diameters, and the resulting extra light construction is said to appeal particularly to designers seeking minimum weight per horsepower. These bearings are made in sizes from $1\frac{1}{2}$ to 12 in. bore, with load ratings at 600 r.p.m. ranging from 840 to 17,120 lb. The sectional view herewith gives a general idea of the proportions of these bearings.

Bakelite for Ignition

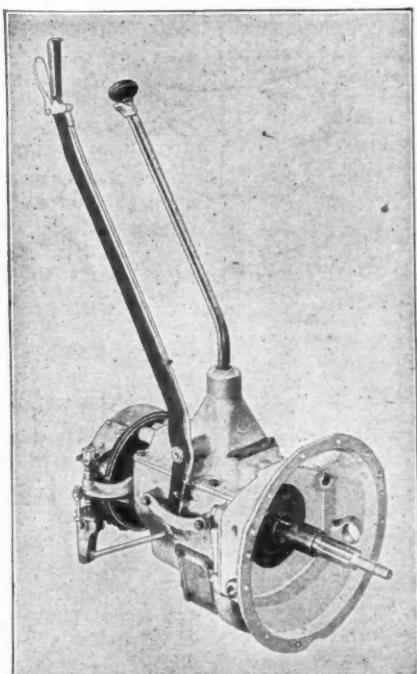
BAKELITE XM-1000 is a new molding material announced by the Bakelite Corp. This material is designed primarily for use on distributor caps and magneto insulation. It was developed especially to meet the demands of aircraft engine ignition. Bakelite XM-1000 is said to have high insulation value, high dielectric strength, and exceptional ability to resist carbonization under the action of the electric arc. In this requirement it is said to be as satisfactory as rubber and consequently makes rubber inserts unnecessary.

Bakelite Data Sheet No. 9 gives detailed specifications and essential data regarding characteristics and processing of this material.

Clark Transmission

AFOUR-SPEED transmission for one-ton trucks is being manufactured by the Clark Equipment Co. at its plant in Berrien Springs, Mich. This new product is standard equipment on light trucks made by three large manufacturers. Its final tests were made late last spring.

The transmission has four speeds forward and one in reverse. Ratios of the gears for the various speeds are: First speed is 6.57 to 1; second, 3.58 to 1; third, 1.75 to 1; fourth, 1 to 1, and reverse is 7.88 to 1. The shifter forks are forgings. An 8-in. brake band contacts with a drum 2 in. wide. This is an external contracting type of brake. The entire transmission weighs 132 lb.



Above is the new one-ton truck transmission that is being manufactured by the Clark Equipment Co.

Milburn Acetylene Generator

A NEW portable acetylene generator for welding and cutting operations, which has a body of drawn seamless steel and is said to be lighter and stronger than generators of other design, has been placed on the market in three sizes by the Alexander Milburn Company of Baltimore, Md. The generator is said to be of simple design. The carbide hopper feed control and head are assembled in one unit which can be detached from body by the removal of a few bolts. The carbide feed is controlled by a single valve which responds to high or low pressure and automatically stops when the pressure is zero, or if the filler is open or the generator is not properly closed.

Tests are said to have been made by the Underwriters' Laboratories on these generators in which they were tipped at different angles or thrown over while in different stages of operation, and in no case did the pressure of the generator rise nor the machine operate abnormally. The generator is equipped with blow-off valves, pressure control, safety gas purifier and strainer. All outlets are welded into the seamless body of the machine.

The three sizes of generator have capacities of 35, 70 and 100 lb., respectively.



Milburn portable acetylene generator

U. S. Multispeed Buffer

AVARIABLE speed buffer and polisher, known as the U. S. Multispeed Buffer and Polisher, has been placed on the market by the United States Electrical Tool Co. of Cincinnati, Ohio.

This buffer provides a flexibility in speeds by means of a Gibbs V-disk transmission of graphitized micarta. A cone or series of different sized disks revolve on the motor spindle. Any one of these can be quickly inserted into a stationary metal V-disk or sheave mounted on the wheel spindle. The motor and disk cone are mounted on a rocker arm so that they may be easily moved along the mounting parallel with the wheel spindle. Changes in speed are made only when the motor and wheels are not in motion. These buffers provide a range of four speeds.



U. S. Multispeed Buffer

First with
the News

Reliable,
Accurate

News of the Industry

PAGE 458

VOLUME 61

Philadelphia, Saturday, September 28, 1929

NUMBER 13

Seasonal Sales Decline, Slowing Down Production

PHILADELPHIA, Sept. 26—The automobile industry has entered the second half of September with production running at a pace which reveals that adjustment to the normal seasonal decline of sales has been put into force. The rate of output of passenger cars and trucks, taking the industry in the United States and Canada as a whole, is probably running a little more than 10 per cent below the level maintained during August. It is not at all certain, however, that the total production figures for this month will show a drop below that of September, 1928, when the factories turned out 436,507 vehicles.

A frequently repeated question among students of production trends at this time appears to be whether September will be the first month this year in which production is to fall below that of the corresponding month of last year.

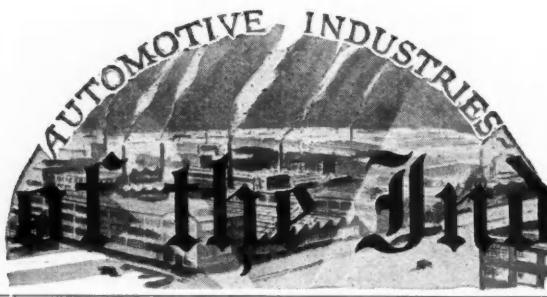
Evidence of curtailment at present is not sufficient to upset the opinion expressed recently in *Automotive Industries* that the 5,000,000 mark will have been reached by the close of October. With official Department of Commerce figures showing the output for the first eight months of this year as 4,443,388, an output of only 556,612 during September and October will achieve this total.

Particular emphasis is being laid upon sales at this time, especially in used cars. Stocks of this class of merchandise continue high and dealers are making strenuous efforts in the way of advertising and price reductions to clean up this inventory before the approach of cold weather, when long and expensive storage will be necessary.

New car sales are reported as normal for this time of the year, and a number of factories which have recently introduced new models continue to report exceptionally good business.

Hotchkiss Breaks Record

PARIS, Sept. 17 (Special)—A slightly modified stock six-cylinder 184 cu. in. Hotchkiss has broken the world's 4000-mile record in 50 hr. 39 min. 32 29/100 sec., or at 78.95 m.p.h. The car, which had a specially low, fabric leather body, was equipped with two carburetors and had higher compression than the normal models, but otherwise was standard. The four drivers were Tchernowsky, Corvaia, Delgate and Vasselle.



General Motors Now in Radio Business

Purchase of Day-Fan Concern
Announced by Sloan,
Confirming Rumors

DETROIT, Sept. 26—Alfred P. Sloan, Jr., president of General Motors, has announced officially the entry of the corporation into the radio manufacturing field with its acquisition of the Day-Fan Electric Co. at Dayton, Ohio.

General Motors has purchased the entire business and plant of the Day-Fan Electric Co., which ranks well to the front among the large independent radio manufacturing companies of the country. Hereafter the Day-Fan radio will be known as a product of General Motors. The present policies of the Day-Fan company will be continued.

Radio offers a logical step for General Motors. Its organization is made up of men who have had a part in the tremendous growth and development of the automotive industry. Their knowledge of quantity production methods and experience and knowledge of distribution of its products to the public put General Motors in an unusual position to expand rapidly in the radio field.

The Day-Fan Electric Co. occupies a large factory at Dayton, manufacturing a radio receiver of the quality type. In 1922 it began manufacture of radio parts and in 1924 commenced manufacture of receiving sets. Its plant occupies some eleven acres and employs more than 700 workers.

Show Space Drawings Set for October 3

NEW YORK, Sept. 25—Work on next winter's Automobile Shows is well under way. The allotment of exhibition space for the various makes of cars to be shown at the 30th National Automobile Shows in New York and Chicago will take place Oct. 3 at the offices of the National Automobile Chamber of Commerce, New York City. The New York Show will be held in Grand Central Palace Jan. 4 to 11, and the Chicago Show is to be held in the Coliseum Jan. 25 to Feb. 1.

Germany is Making Bid for French Markets

BERLIN, Sept. 20 (Special)—Last year the German industry was admitted for the first time since the war to the French Salon and the companies that took advantage of this are said to have been satisfied with the business. This year the number of German works going to Paris will be much increased. Adler, Daimler-Benz, Hanomag, Horch, N.A.G., Opel, Roehr, Stoewer, Wanderer and D.K.W. will be represented at the Passenger Car Salon running from October 3 to 13. The Motor Cycle Salon will be visited by B.M.W. and D.K.W. and probably also by Zuendapp and Triumph.

Erie Malleable Wheel Expands

ERIE, PA., Sept. 24—The Automotive Wheel division of the Erie Malleable Iron Co. is erecting an additional unit which will double its present space.

Consolidated Announces Earth Inductor Compass

NEW YORK, Sept. 25—The Consolidated Instrument Co. of America, Inc., announces the development of a new earth inductor compass, which embodies many improvements upon the original type developed by Dr. Paul R. Heyl and Dr. Lyman J. Griggs of the Bureau of Standards for the United States Army.

U. S. Rubber Offers Bonus Plan

NEW YORK, Sept. 24—The United States Rubber Co. has called a meeting of its stockholders for Oct. 15 to consider the adoption of a bonus plan for employees.

Ford's Irish Plant Hit by Tariff Bill

Amendment to Bar Importing Under Trade Mark Passed by Senate

WASHINGTON, Sept. 24—Americans with factories abroad would be prevented from sending their foreign-made articles to this country under an American trade mark by an amendment to the tariff bill, approved by the Senate today by a vote of 46 to 31.

Sponsors of the amendment admitted it was aimed largely at Henry Ford, whose tractors, it was stated in debate, are now made in his plant in Ireland.

Under existing law, the importation of an article bearing a trade mark registered in the United States is forbidden, "unless written consent of the owner of such trade mark is produced at the time of making entry."

The House permitted this law to stand, but the Senate Finance Committee eliminated the quoted words, thus preventing any importation of such goods. The Senate sustained the Finance Committee.

"Permitting the language to stand would mean the beginning of a movement to transfer American-owned factories abroad at lower labor costs," said Senator Reed, supporting the Finance Committee amendment. "When that happens, as in the case of Henry Ford, just so many American workmen would lose their jobs and be replaced by foreign labor."

According to Senator Reed, harvester and sewing machine manufacturers should not be allowed to import products under an American trade mark. He said that in the case of harvesting machines and Ford tractors the only entry cost to the manufacturer would be ocean transportation.

Sears, Roebuck Denies Martin Car Sale Rumor

PHILADELPHIA, Sept. 24—Emphatic denial that Sears, Roebuck & Co. would have any connection with the manufacture or distribution of the light automobile, designed by James V. Martin, Washington and Long Island City, N. Y., was issued here today by Sears, Roebuck & Co.

Lessing J. Rosenwald, vice-president of Sears, Roebuck & Co., with offices here, said that all the publicity regarding the connection of his company with the new car was false, and that the company was not now interested in the production or sale of the car.

Spicer Concentrates in Toledo

TOLEDO, Sept. 24—Engineering, buying and sales departments of the Salisbury Axle Co., Jamestown, N. Y., controlled by the Spicer Mfg. Corp., are being centered in Toledo since the moving here of the rear axle department of the Salisbury unit.

British Are Working on New Racing Car

LONDON, Sept. 21—A new racing car with a two engine, 24-cylinder, 4000 hp. motor is being built secretly at Wolverhampton for an assault on Sir Henry Segrave's speed record. The builders are confident that it is capable of 289 to 300 miles an hour, and is the most powerful car ever made. Experiments are being made with silk tires, which, according to the manufacturers, are better able than any others to withstand the terrific friction of traveling 300 miles an hour.

Mayle Expanding Plant

TOLEDO, Sept. 25—The Mayle Manufacturing Co., makers of dies for the automotive industry, has awarded a contract for a \$25,000 addition to its plant in Toledo. The company has recently installed a Keller automatic die sinking machine which has increased its capacity about 50 per cent. About 50 more employees will be taken on as a result of the expansion. Albert M. Mayle is president and S. N. Sloan, secretary-treasurer of the company. Business of the company has shown a big growth this year.

Dayton Buys Eastern Aircraft

DAYTON, OHIO, Sept. 24—The Dayton Airplane Engine Co., has acquired the Eastern Aircraft Corp., of Pawtucket, R. I. The Eastern Aircraft organization has a long-term contract to manufacture the German all-metal Messerschmitt plane in this country.

Franklin Executives to Attend European Shows



Executives of the Franklin Automobile Co. who are to attend the London and Paris international shows. Left to right: Lloyd B. Benham, export manager, who sailed Sept. 27 on the *Île de France*; L. J. Purdy, factory manager, and Ralph Murphy, vice-president and general manager, sail Oct. 2 on the *Aquitania*. The men will return to America about the middle of November

General Motors Unit Deliveries Recede

August Consumers Took 173, 384 Units, President of Organization Says

NEW YORK, Sept. 26—General Motors dealers delivered to consumers 173,384 cars during August, according to announcement by Alfred P. Sloan, Jr., president. This compares with 187,463 for the corresponding month a year ago. Sales by General Motors manufacturing divisions to dealers were 168,185 as compared with 186,653 for the corresponding month last year. Comparative figures for the first eight months of the current year follow:

	Dealers Sales to Users	1929	1928
Jan.	104,488	107,278	
Feb.	138,570	132,029	
Mar.	205,118	183,706	
Apr.	223,303	209,367	
May	214,870	224,094	
June	194,705	206,259	
July	181,851	177,728	
Aug.	173,884	187,463	

	Divisions Sales to Dealers	1929	1928
Jan.	127,580	125,181	
Feb.	175,148	169,232	
Mar.	220,391	197,821	
Apr.	227,718	197,597	
May	220,277	207,325	
June	200,754	186,160	
July	189,428	169,473	
Aug.	168,185	186,653	

Stewart-Warner Buys Property

CHICAGO, Sept. 25—The Stewart-Warner Corp. has purchased a nine-acre tract and buildings.

Fokker Will Build Large Coast Plant

\$300,000 Factory to be Used to Construct 30-Passenger Transport Liners

NEW YORK, Sept. 23—Fokker Aircraft Corp. has announced plans for the erection of a factory in Los Angeles, adjacent to the Alhambra airport, for the construction of the new F-32, 30-passenger transport plane. This will cost in the neighborhood of \$300,000.

The announcement was made by Harry M. Hansue, president of Fokker, and J. A. Talbot, chairman of the board. This move is made as one of the first steps in the expansion program resulting from the affiliation with General Motors Corp.

The factory will employ 500 men and will immediately start production of the new planes, placing them on the basis of one ship a week. It is expected that this schedule will be doubled inside of 18 months.

Western Air Express, of which Mr. Hansue is also president, has ordered six of these planes, which will be placed on the Western Air Express routes between Los Angeles, San Francisco and Kansas City.

Rubber Trading Desultory

NEW YORK, Sept. 23—Trading in crude rubber continues desultory, according to F. R. Henderson Corp. The publication last week of tire and tube statistics for July resulted in slightly advanced prices which were only temporary. There was practically no change in stock in the producing centers in spite of rumors to the contrary.

The company points out that tire statistics as of Sept. 1 will probably show further reductions in inventory figures and they believe that this will result in a stronger position in the crude rubber market.

Stocks in London have continued to increase and last week reached a total of 37,901 tons, with Liverpool increased to 8660 tons. Arrivals at all ports of the United States during the first three weeks of September are estimated at 23,500, with the estimate for the entire month's imports unchanged at 37,500 tons.

German Engine Imports Up

BERLIN, Sept. 21 (Special)—During the first seven months of this year 67,259 gasoline engines were imported into Germany compared with 38,842 during the same period last year. Of this number 44 per cent were supplied to the ten foreign assembly plants working in Germany. The increase in value has not been as great as that in quantities owing to price reductions and to the fact that most of the increase is to be ascribed to motorcycle engines. The total value of these imported motors was 20,510,000 marks.

Alfa Romeo, With Varzi at Wheel, Wins Monza Grand Prix at 117 Miles an Hour

PARIS, Sept. 17 (Special to Automotive Industries)—Varzi, driving a 122-in. supercharged Alfa Romeo, won the Monza Grand Prix, held on the 2½-mile speed track at Monza, Italy, by covering a distance of 62 miles in 31 min. 38 sec., or at 117 m.p.h., this being the highest speed ever attained during open competition in Europe. Nuvolari on a straight eight 91-in. Talbot finished second, Monberger on Mercedes was third, Brilli Peri on Alfa Romeo was fourth and Cafisch on Mercedes fifth.

Leon Duray entered two front-drive Packard Cable Specials in this event, one to be driven by himself and the other by the French driver Bourlier, formerly with Delage. The day's racing, which was witnessed by 80,000 people, comprised three distinct races of 62 miles each, under piston displacement limits, and a final for the three fastest in each of the preliminary heats.

Duray started in the 91½-in. class, and was the last off the line, but got into the lead at half distance. One lap later he withdrew with defective lubrication system, leaving the race to be won by Nuvolari on Talbot, with another Talbot second and a Maserati third.

Having bored out a set of cylinders so as to exceed 91½ in. Duray started in the 183-in. class. From eighth place on the first lap he worked up to third place after eight laps (20 miles), then was passed by Varzi on the 122-in. Alfa Romeo and three laps later went out

with defects in the lubrication system. The race was won by Brilli Peri on Alfa Romeo, with a Maserati second and an Alfa Romeo third.

The failure of Duray to qualify either of his cars caused an immense surprise, for he broke the track record in practice, at an average of practically 120 m.p.h. and by reason of his front-drive was believed to have a considerable advantage over the European machines. In the final, however, Brilli Peri on a 122-in. Alfa Romeo drew away from Duray all the time, his second lap being only three-fifths of a second slower than Duray's record in practice, and on the third round he beat the American's lap record by one-fifth of a second. A burst tire eventually dropped him back to fourth place, 2 min. 41 sec. behind the winner.

The third heat was won by a supercharged six-cylinder Mercedes, which defeated a 16-cylinder Maserati by half a length. Another Mercedes was third.

This is the first occasion on which sprint races have been held on a European track. Vincenzo Florio, president of the Racing Board of the Royal Automobile Club of Italy, was responsible for the innovation, which proved a complete success. The races were run on the short track, which closely resembles Indianapolis, and is 2½ miles 'round.

Since the disaster last year a heavy armored concrete wall has been built on both the inside and the outside of the straightaways. There were no accidents during the race or in practice.

The German passenger car industry exported in this period cars to the value of 21,379,000 marks, so that the imports of engines alone almost amount in value to these exports.

Western is Completing Plant

DETROIT, Sept. 24—Western Gear Co., manufacturers of automotive gears, is rapidly completing the installation of equipment in its new plant here, according to K. W. Macrae, president and general manager. The company's new plant is situated on a seven-acre tract and on a main line of the Michigan Central Railroad with direct siding into the property. It has more than 50,000 sq. ft. manufacturing floor space and the heat-treating plant occupies a separate building of more than 8000 sq. ft.

Announces Screw Machine Session

CLEVELAND, Sept. 24—The Screw Machine Products Association will hold a meeting at the Hollenden Hotel on Tuesday, October 1. The morning will be taken up with a meeting of the Screw Machine Products Institute, of which Dr. Arthur E. Swanson of Chicago is director. At the afternoon session the activities of the Institute, which are of more general interest, will be presented in an open meeting.

Franklin Will Exhibit

at Two European Shows

SYRACUSE, N. Y., Sept. 26—At the Paris show, which opens on Oct. 3, the H. H. Franklin Mfg. Co. will display, among others, a speedster model, close-coupled and seating four, and a model 130 convertible coupe, just introduced. There will also be on exhibit the latest type of Franklin air-cooled engine. A supplementary exhibition will be maintained in the Rue de Belles Feuilles.

At the Olympia show in London, which follows shortly after the Paris salon, the company will exhibit two chassis with English-built custom bodies, designated as "Sportsman's Coupe." These models are four-passenger types with a single door on each side. In addition, various standard types of Franklin cars also will be shown at both of the international exhibits.

Johns-Manville Forms Export Firm

NEW YORK, Sept. 26—Johns-Manville International Corp. has been organized to handle all the export business of Johns-Manville Corp. Lewis H. Brown, president of the parent corporation, is chairman of the board of the new company, and E. R. Weigle is president.

August Parts and Accessory Sales Drop; First Recession in Year, M. E. A. Reports

NEW YORK, Sept. 24—The high tempo established in parts and accessories sales during the first seven months of the year suffered a setback in August and the Motor and Equipment index for the first time this year fell below the indices for corresponding months last year.

The grand index for all groups for August this year is 182 as compared with 188 in July and with 212 in August a year ago. This is the result partially of reduced production schedules by automotive manufacturers for September and is not considered as pre-saging any definite setback in the industry.

The remaining three months of the year can all fall below the corresponding months of the previous year and still a record year for 1929 seems definitely assured. This tendency which is noted in the general index is also characteristic of each individual group.

Original equipment index for the month was 193 as compared with 205 in July and 230 in August of last year.

Service parts index is 169 as com-

pared with 152 in July and 176 in August a year ago.

Accessories set an index of 88 as compared with 92 in the previous month and 147 a year ago.

Service equipment index fell even with the previous month at 170 as compared with 148 in August of last year, being the only group which set a higher index in August of this year than in the corresponding month a year ago. This group usually comes in for heavier buying toward the end of the summer.

Wholesalers throughout the country presented a very uneven situation. For the country as a whole sales by wholesalers were 134 based on 100 of January, 1928, as compared with 132 in July. This index results from increased sales in five Federal Reserve Districts, even sales in one and decreased sales in the remaining five Federal Reserve Districts and in Canada.

Collections of wholesalers show a marked slowing up, accounts receivable being seven points higher in August than they were in July, basing the figures again on January, 1928, as 100.

Backbone of German Car Industry is Small Types

BERLIN, Sept. 22 (Special)—Figures from 22 German automobile manufacturers compiled by the German Automobile Makers Association, show that, compared to August of the previous year, there has been an increase in the sales of small cars with a piston displacement up to 61 cu. in. of 70 per cent. But the sales in the 93 cu. in. up to 183 cu. in. lines, which have formed the backbone of the German industry, were unsatisfactory.

The sales of larger cars having motors of 224 and more cu. in. piston displacement, on the other hand, showed an increase of 12 per cent. Taken all in all the 22 plants had an increased output of 10 per cent during July and August as compared to these months in 1928.

The German industry now estimates that its total increase in production will only amount to 5 per cent this year, which is considered very bad as it stands in no proportion to the increase in registrations and is insufficient to pay for the improvement made in the manufacturing plants to insure greater output.

Distributors Visit Durant Plant

DETROIT, Sept. 19—Durant distributors and dealers from central and western Michigan visited the company's plant at Lansing Wednesday, and after a visit through the plant and a program of addresses during a luncheon at the Hotel Olds, returned to their homes, driving back approximately one hundred new cars. Among those addressing the dealers were Frederick J.

Haynes, president; A. I. Philip, chairman of the board, and several other high officials of the company.

Announces Salon Exhibitors

NEW YORK, Sept. 25—The list of exhibitors at the Chicago Salon, which is to open Nov. 9, has been announced by the management as follows: Cadillac, Cord, Cunningham, Duesenberg, Franklin, Isotta, LaSalle, Lincoln, Minerva, Packard, Pierce-Arrow, Rolls-Royce, Ruxton and Stutz. Special coachwork exhibits will be made by Baker-Raulang, Brewster, Brunn, Dernham, Dietrich, Fisher, Fleetwood, Holbrook, Judkins, Le Baron, Locke, Murphy, Rollston, Weymann and Wiloughby. Various chassis will mount custom coachwork by prominent European carrossiers. The Chicago Salon, which is to be held in the new ballroom in the Drake Hotel, will be followed on Dec. 1 by the New York Salon.

Toledo Body Plant in Production

TOLEDO, Sept. 24—The City Auto Stamping Co., a \$2,000,000 heavy auto body stamping concern growing out of the City Machine & Tool Co., is just starting production in its new plant.

Allied Shipments Increase

LOS ANGELES, Sept. 25—Shipments by the Allied Aviation Industries, Inc., for August show a large increase, with engine totals gaining 44.4 per cent and planes 70.6 per cent. Twenty-nine planes were shipped compared with a previous rate of 17 a month and 39 engines against former rate of 27.

Automotive Buying Holds Steel Steady

Low-Priced Car Makers Continue as Routine Buyers of Mills

NEW YORK, Sept. 26—Some fourth-quarter business has been placed, and while the steel market as a whole is dull by comparison with the earlier summer months, automotive consumers, especially the two leading manufacturers in the low-priced passenger car field, figure as routine buyers.

Here and there one hears of a purchasing agent shopping around for possible price concessions, more to satisfy himself that published reports of the market's steadiness in spite of the decline in the demand are true than to bring pressure on prices, but so far no out-and-out case of price-cutting has been uncovered.

Some business in cold-rolled strip steel is said to have been turned down when the prospective buyer insisted upon concessions.

While a good deal is heard about steel producers declaring that they would rather sacrifice backlog and cut down on their operating rate than to make price concessions to buyers, the fact is that there is virtually no business in sight that might be placed if the seller consented to shade price or withhold if he did not.

What business is coming out is of the routine sort, and there is no disposition among automotive consumers to buy a single ton more than their own nearby manufacturing schedules call for.

With the easing off of pressure on finishing capacity, steel is shipped so promptly following receipt of specifications that consumers see no reason for anticipating their wants more than by two or three weeks.

Aluminum—Demand is seasonally light. Die-casting plants have a very fair run of orders for pistons on their books. The market is unchanged.

Copper—The market has turned rather dull at unchanged prices.

Tin—Quiet conditions prevail with prices somewhat easier.

Zinc—Demand has broadened and prices rule a shade firmer.

Fifteen Hurt at Track

MINEOLA, L. I., Sept. 25—Fifteen persons were injured in a series of three accidents which marked dirt-track racing held as the closing feature of the Mineola Fair here Saturday. James "Jimmy" Gleason, Philadelphia racing driver, was seriously injured when his car locked with another, and later crashed through the guard rail. A car driven by Gordon Condon, Altoona, crashed through the rail following collision with another car, and several spectators were injured by flying debris. Condon was unhurt. Milton Marion, New York, lost a wheel from his Hispano-Suiza. The car was badly damaged but no personal injuries resulted.

Huge Steel Merger Is Sixth Largest

Formal Announcement Expected in Great Lakes-Weirton Reorganization

DETROIT, Sept. 26—Formal announcement of the consolidation of the M. A. Hanna Co., of Cleveland; the Great Lakes Steel Corp., of Detroit, and the Weirton Steel Co., of Weirton, W. Va., resulting in what is declared will be the sixth largest steel producing unit, is expected shortly. Negotiations are under way, it is understood, for the formation of a holding company representing nearly \$150,000,000 assets and involving the exchange of securities having present market values in excess of \$200,000,000.

The holding company will be a Delaware corporation, it is said, with headquarters in Wilmington, Del., and offices in Cleveland, Detroit and Pittsburgh. It is understood that E. T. Weir, president of the Weirton Steel Co., will become chairman of the board. George M. Humphrey, president of the Hanna company, chairman of the executive committee, and George R. Fink, president of the Great Lakes Steel Corp. and of the Michigan Steel Corp., president of the holding company.

Each merging company will continue to be operated by its own personnel retaining its present identity. No management changes are expected.

The company will own a half interest in 150 Koppers ovens of Donner Hanna Coke Corp., Buffalo, with 700,000 tons annual capacity and 86 Koppers ovens at Weirton, having 550,000 tons annual capacity.

Total ingot capacity will approximate 1,800,000 tons.

Predicts Market in China

TOLEDO, Sept. 25—China has the greatest sales possibilities for motor car manufacturers and is the world's greatest potential and least developed market at the present time, in the opinion of R. J. Archer, vice-president and general manager of the John N. Willys Export Corp., who has lately returned from a seven months' tour of the world and who addressed the foreign trade committee of the Chamber of Commerce here this week. "The successful salesman in most foreign countries is not the go-getter but the one who knows his product and is in no hurry to get it across," he said.

DeVlieg Joins Cirrus

DETROIT, Sept. 24—Ray A. DeVlieg, formerly general production manager of the Chrysler Corp. at the Highland Park plant, has joined the American Cirrus Engines, Inc., as vice-president in charge of manufacture at the Marysville, Mich., plant. R. J. Fitness, formerly with Chrysler, has also joined the American Cirrus as chief engineer.

M. E. A. Members Hear Prof. Thorp

CLEVELAND, Sept. 23—Mergers are not a "cure-all" for industrial problems, according to Prof. Willard L. Thorp, of the department of economics, Amherst College, who spoke last week before the annual Credit Conference of the M. E. A. He cited figures showing that mergers have increased rather than decreased production costs.

Industrial Machinery Imports Gain in Italy

WASHINGTON, Sept. 24—Italy as a market for industrial machinery is described in a report prepared by A. A. Osborne, assistant commercial attache, Rome, and made public by the Department of Commerce this week. The report points out that imports into Italy began to increase with the stabilization of the lira in 1927 and has continued through 1928 and 1929. An interesting sidelight of the study is the fact that there was invested in the automotive industry in Italy on December 31, 1913, a total of \$12,988,000, which had grown to \$47,470,000 on December 31, 1927. The automotive industry ranked fourth in the amount of money invested among the leading branches of Italian machine-using industries.

Canadian Production Drops

OTTAWA, ONT., Sept. 25—Production of automobiles in Canada in August was the lowest reported for any month of the current year and amounted to less than one-half of the production total for the corresponding month of last year. In August, 14,215 cars were produced as compared with 17,461 in the previous month and 31,245 in August of last year. Canadian production of automobile parts and accessories in 1928 amounted in value to \$17,007,157, which was the highest total reported since 1923, when production established the high record in the industry's history at \$22,000,640. This year's output was approximately 2,000,000 in excess of that for 1927. A total of 77 plants were engaged in the business, representing invested capital of \$16,343,956.

Metalcraft Declares Extra Dividend

GRAND RAPIDS, MICH., Sept. 24—Grand Rapids Metalcraft Corp. has declared an extra dividend of \$.10 per share in addition to the regular dividend of \$.25 making a total of \$1.15 per share declared so far in 1929. The extra dividend is payable Dec. 20 to stockholders of record Dec. 10, while the regular dividend is payable Oct. 15 to stockholders of record Oct. 8. Officials of the company have stated that the final six months of 1929 will be the largest in the history of the organization. On Aug. 31 the balance sheet showed approximately \$500,000 on hand in cash and marketable securities.

Ford's Agent Fights Mexican Labor Code

Submits Memorandum Giving
Detroit Manufacturer's
View of Bill

MEXICO CITY, Sept. 26—Adrian Rene La Jous, local representative of Henry Ford, has formally voiced the Detroit automobile manufacturer's objection to the proposed new labor code in a memorandum presented to the Mexican Congress offering suggestions and amendments to the law which employers consider essential for the welfare of their interests, the interests of labor and of the country as a whole.

La Jous, in his memorandum, which is issued in the name of the Mexican subsidiary of Ford Motor Co., expresses the hope that the observations contained in the memorandum will be taken into account when certain articles of particular objection to the company are brought up for discussion.

The Ford protest is directed at only three specific provisions of the law, namely, obligation it provides of celebrating collective contracts, obligation of furnishing workers with hygienic, comfortable homes, even if they reside within cities, and the thesis sustained by the new law that three months' indemnity payment to discharged workers whose services have been found undesirable is not sufficient remuneration.

Enforcement of collective contracts, the memorandum declares, attempts to enforce a rigid system on the employer and employed without taking into account that in many cases an imposition is harmful to the interests of both sides.

Develops New Air Log

NEW YORK, Sept. 26—Pioneer Instrument Co. has developed an air log, or distance recorder, for mounting on the instrument board of an airplane. This device is actuated by a small propeller which is caused to revolve as the airplane moves forward. This propeller is set according to the speed of the plane so that for each mile it will make a sufficient number of revolutions to trip a valve which admits a vacuum created by a small but powerful Venturi tube. This vacuum operates through a brass or copper piping from the dial, adding one mile to the distance recorded. The dial has a hand which makes the complete revolution for every 100 miles and the face is calibrated accordingly.

Commission Approves Gas Drop

LANSING, MICH., Sept. 18—A reduction estimated to be several thousands of dollars monthly in the gas bills of the General Motors Corp., and other industries, was approved today by the Public Utilities Commission at the request of the Consumer's Power Co. In requesting the lower rates, the company mentioned Lansing, Flint and Pontiac, where various plants are located.

Marmon's Half Year is Best in History

Earnings and Shipments Gain
Over Last Year, Says
President Williams

INDIANAPOLIS, Sept. 25—Net earnings of the Marmon Motor Car Co. for the six month period ended Aug. 31, 1929, amounted to \$1,150,282.03, after Federal taxes and all other charges. The sum of \$62,281.03 was earned during the second quarter, G. M. Williams, president of the company, announced today. The net result of operations for the six months is in excess of the regular common stock dividends for an entire year and is approximately 90 per cent of the net earnings of the company for the fiscal year ended Feb. 28, 1929, which amounted to \$1,271,665.31 after Federal taxes and all other charges.

Shipments of Marmon and Roosevelt automobiles during the six months totaled 21,841 units representing an increase of approximately 110 per cent over the corresponding period of last year and the net sales volume in amount in the same period represented an increase of approximately 48 per cent, the difference in the percentages of increase being due to the lower unit price of the Roosevelt.

Tests Made on Parachute Material for Porosity

WASHINGTON, Sept. 25—A special apparatus for calculating the amount of air passing per minute through parachute fabric has been developed by the Navy Department in cooperation with the Bureau of Standards. The limits of porosity of parachute materials were determined by testing the fabrics on the apparatus, and then conducting service tests to determine the rate of descent of the parachute.

Propose Huge Aero Merger

NEW YORK, Sept. 24—Financial interests, headed by John A. Love of Love, Bryan & Co., who is chairman of the board of Allied Aviation Industries, Inc., and a director of Fokker Aircraft Corp., are laying plans for the merger of a number of aircraft manufacturing and aviation concerns involving British, American and French companies. It is expected that one British company, one American company and two French companies, with combined assets of £1,400,000, will be involved in this proposed merger.

Meeting on Buffing Wheels

WASHINGTON, Sept. 24—A meeting will be held in the Department of Commerce Building on Oct. 7 to consider a recommendation for a Simplified Practice with respect to buffing wheels. The recommendation covers diameters for stock sizes. B. H. Divine, president of the Divine Brothers Co., is chairman of the committee which formulated the proposed Simplified Practice.

"Blind" Flight Shows Instruments' Value

NEW YORK, Sept. 24—Using an improved instrument for indicating longitudinal and lateral position of a plane in flight, a new directional gyroscope, and a sensitive barometric altimeter, Lieutenant James H. Doolittle demonstrated the practicability of complete airplane flights using only the instruments for guidance, over Mitchel Field today. Flying a Consolidated-Wright plane used by the Daniel Guggenheim Fund for the Promotion of Aeronautics in experimental work, Lieutenant Doolittle took off, flew two miles east of the field, and returning, made a good landing. The cockpit of the plane was covered by a canvas hood, which excluded all light and vision, during the course of the experimental flight.

Miniger Group Executives Meet to Get Acquainted

TOLEDO, Sept. 24—To bring about greater coordination in the big \$160,000,000 group of automotive parts manufacturing concerns headed by the Electric Auto-Lite Co., and C. O. Miniger, a meeting of 60 executives and important department heads was held here at the Commodore Perry hotel. Dan Kelly, vice-president, was chairman of the morning and afternoon sessions. A banquet in the evening was held at the Toledo club.

Among the plants and industries represented were the Toledo, Fostoria and Adrian, Mich., units of the Electric Auto-Lite Co.; foundry division at Fostoria, Fostoria Machine & Tool Co., Burt Foundry Co., of Toledo; City Machine & Tool Co., City Auto Stamping Co., Logangear Co., Bingham Stamping & Tool Co., Monroe Auto Equipment Co., of Monroe, Mich.; U.S.L. Battery Corp., Niagara Falls; Prest-O-Lite Battery Co., Indianapolis; Prest-O-Lite, Ltd., Toronto; Marko Storage Battery Co., Brooklyn, N. Y.; Wubco Storage Battery Co., Pittsburgh, Pa.; American Enamel Wire Co., Muskegon, Mich.; J. W. Brown Mfg. Co., and Columbus Auto Parts Co., of Columbus.

Martin to Offer Shares

NEW YORK, Sept. 24—The Glenn L. Martin Co., which sold its Cleveland plant some months ago to the Great Lakes Aircraft Co., and moved its operating facilities to Baltimore, where it has erected a new plant, will make a public offering of stock within the next few days. The company will continue to manufacture military planes and will also expand into other fields of aviation. The new plant will be in operation about Oct. 1.

Offers Elcar Stock

NEW YORK, Sept. 24—A block of 18,200 shares of Elcar Motor Co. common stock of no-par value will be placed on the market today by L. R. Nessel & Co. at \$10.50 a share.

Chevrolet Airplane Engine Given Tests

Air-Cooled Powerplant Will
be Built in Indianapolis,
Backers Report

INDIANAPOLIS, IND., Sept. 24—Financial and manufacturing representatives from Indiana and Kentucky are meeting here this week to lay plans for the manufacture of the new air-cooled, cylinders-in-line airplane engine developed by Arthur Chevrolet, widely known engineering genius, of this city.

Mr. Chevrolet returned to Indianapolis early this week with Byron P. Prunk, vice-president of the Arthur Chevrolet Aviation Motors Corp., after demonstrating his Chevolair engine before aeronautical division of the Department of Commerce.

While the Chevrolet officers were in the capital with their motor, another model of the Chevolair was proving its airworthiness in exhibition flights at the Cleveland air races, where its unusual power and design attracted much attention.

McDonald is Planning Engineering Laboratory

DETROIT, Sept. 25—McDonald Bros., Inc., production engineers with offices in Boston, New York, Chicago and Cleveland, announced this week plans for a huge engineering laboratory to be constructed in this city at a cost of several million dollars. The sponsors of the project say that this will be the world's largest engineering laboratory, providing space for members of the laboratory to display and demonstrate their machinery as well as office space and facilities for handling sales.

Harry C. Miller

AKRON, Sept. 26—Harry C. Miller, 54, for 30 years in tire sales work at the B. F. Goodrich Co., who held the position of manager of manufacturers sales at the plant, died Monday night in Harper Hospital, Detroit. In 1915 he was made assistant general sales manager. In 1924 he took over the position which he held until he died.

Railroads Buy Buses

NEW YORK, Sept. 24—The Missouri Pacific, Burlington, Union Pacific and Potomac Edison railroads have ordered 18 straight-eight buses from the Studebaker Corp. to be added to their lines. The Missouri Pacific has ordered six, bringing its total Studebaker fleet to 29; the Burlington has just bought five, the Union Pacific three, and the Potomac Edison, of Hagerstown, Md., four.

Ryan Will Build Parks Aircraft

ST. LOUIS, Sept. 25—Manufacture of Parks airplanes will be conducted by the Ryan Aircraft Corp., which probably will be moved from Lambert-St. Louis Field, the St. Louis municipal airport, to Parks Airport at East St. Louis, Edward S. Evans, president of the Detroit Aircraft Corp., announced.

Men of the Industry and What They Are Doing

Canadians Elect Stewart as Good Roads President

The Hon. A. D. Stewart, minister of highways of New Brunswick, was elected president of the Canadian Good Roads Association recently. The Hon. C. L. McPherson was elected honorary president and H. S. Lougheed, British Columbia, was made first vice-president. Directors are: J. L. Boulanger, Quebec; H. S. Carpenter, Saskatoon; E. Cunningham, Montreal; R. A. C. Henry, Ottawa; W. Findlay, Toronto; S. W. Hobart, Toronto; Col. C. P. Hanson, Montreal; R. A. Henry, Ottawa; A. McGillivray, Manitoba; Hon. J. P. McIntyre, Prince Edward Island; A. Pion, Quebec; P. Phillip, British Columbia; J. B. Robertson, Alberta, and A. C. Stewart, Saskatchewan.

Graham Heads Weymann

John Graham, one of the founders of the Holbrook Co., manufacturers of coachwork for high-priced chassis, has been appointed head of the Weymann American Body Co., Indianapolis, a subsidiary of the Weymann body interests of Europe.

According to the announcement, Stutz Motor Car Co. is absorbing practically the entire output of the plant. The bodies are being used in the new Chateau series just announced by Stutz.

Handley-Page Arrives

Frederick Handley-Page, British manufacturer of aircraft, and Capt. James Cordes, pilot, arrived Sunday on the S.S. Minnewaska with a Handley-Page machine which has been entered in the Daniel Guggenheim Safe Aircraft Competition. Captain Cordes will pilot the machine in the tests.

Danly Promotes Fitzsimmons

J. R. Fitzsimmons has been appointed manager of the new Cleveland branch warehouse and assembly plant of the Danly Machine Specialties, Inc., Chicago.

Chosen Acme Advertising Head

W. C. Mackenzie, formerly chief engineer of the Acme Motor Truck Co., Cadillac, Mich., has been appointed advertising manager, according to a company announcement.

Campbell is Recuperating

Colin Campbell, vice-president in charge of sales of the Willys-Overland Co., is still confined in Ford Hospital in Detroit, but has shown such steady improvement that he will soon be permitted to return to his home, it was reported by hospital authorities.

He suffered an embolism in the head on a D. & C. steamer en route to Detroit on Aug. 11.



R. S. Cooper

who has been elected president of the Independent Pneumatic Tool Co., Chicago, filling the post vacated by the recent death of John D. Hurley. He has been associated with the concern since his graduation from Cornell in 1903

Sloan Launches Yacht

The yacht Rene, built by the Pusey & Jones Corporation of Wilmington for Alfred P. Sloan, Jr., president of General Motors Corporation, was launched last week. Mr. Sloan was the sponsor. The boat, which will cost \$1,000,000, is a steel twin-screw cruising Diesel yacht, 236 ft. long.

Reo Export Head in Europe

R. G. Hudson, assistant sales manager of the Reo Motor Car Co., in charge of Canadian and export sales, is in Europe to attend the automobile shows in Paris and London. After various meetings of distributors and dealers held during show time, Mr. Hudson will spend some time making a personal survey of market conditions. Among the cities included in his itinerary are: Amsterdam, Antwerp, Berlin, Copenhagen, Oslo, Stockholm, Helsingfors, Warsaw, Bucharest, Vienna, Rome, Zurich, Paris and Barcelona.

Judkins is Sailing

John B. Judkins is sailing for Europe Sept. 27 on the "Ile de France" to attend the automobile shows at Paris and London in the interests of the J. B. Judkins Co., Merrimac, Mass.

Swigert With Wright Corp.

W. K. Swigert, formerly with Stutz Motor Car Co., has been appointed manager of the Gipsy engine division of the Wright Aeronautical Corp., St. Louis.

Taylor, Former Purchaser, Joins Kelly-Springfield

Roy J. Taylor, formerly general purchasing agent of the Hupp Motor Car Corp., has joined the manufacturers' sales division of the Kelly-Springfield Tire Co., according to an announcement by T. S. Lindsey, vice-president and general sales manager. Mr. Taylor, who recently resigned from Hupp after 16 years as its purchasing agent, will be associated with C. A. Jessup in a sales organization to be known as Taylor-Jessup, Inc., with offices in the Fisher Bldg., Detroit.

Lowry is Traffic Head

Col. R. S. Lowry has been appointed general traffic manager of the Corporacion Aeronautica de Transportes with headquarters in Mexico City, according to an announcement received here from the president, Theodore T. Hull, of Los Angeles.

These lines now operate over more than 5000 miles, carrying air mail, passengers and express over established routes in Mexico, with further early extensions planned. Col. Lowry was formerly an Associated Press staff writer and more recently has been a member of the United States legation at Mexico City.

Bingham Resigns

Jeremiah Bingham, founder and president of the Bingham Stamping & Tool Co., Toledo, recently purchased by the Logangear Co., has resigned as president and general manager of the subsidiary organization and will retire. He has been in the machine tool and stamping industry in Toledo for several years and was associated with William E. Bock in the development of the Bock tapered roller bearing. Since the world war he went in for himself and developed his stamping business to its present size.

Miller is Honored

William H. Miller, chief of research of the Berliner-Joyce Aircraft Corp., Baltimore, has been elected a fellow of the Royal Aeronautical Society of Great Britain. A graduate in 1920 from the University of Missouri, he received a graduate degree from the Massachusetts Institute of Technology. He was with Curtiss Aeroplane & Motor Co. before joining the Baltimore concern.

McLean Resigns

A. J. McLean, manager of the eastern division automotive equipment department of Johns-Manville for the past ten years, has resigned. He states that he has no plans as yet for the future and will not make any decision on his future connections until he returns from a two months' trip to Europe.

Business in Brief

Written by the Guaranty Trust
Co., New York, exclusively for
AUTOMOTIVE INDUSTRIES.

NEW YORK, Sept. 26—There has been some falling off in steel, iron, and automobile trade; but all industries are still making a better showing than a year ago. The cold weather has stimulated the clothing trade; and the demand for ready-to-wear apparel, knit wear, and shoes is brisk. The recent frost in the corn belt does not seem to have done any serious damage.

FACTORY EMPLOYMENT

New York factory employment during August remained at approximately the same level that has prevailed during the last three months but was 6 per cent above the level last August and 2 per cent above that in the corresponding month two years ago.

CRUDE OIL

Average daily crude oil production for the week ended Sept. 14 was estimated at 2,965,400 bbl., as compared with 2,956,350 bbl. for the preceding week and 2,504,900 bbl. for the corresponding week last year.

CAR LOADINGS

Railway freight loadings for the week ended Sept. 7 totaled 1,017,072 cars, which marks an increase of 25,687 cars over those in the corresponding week last year and an increase of 27,273 cars over those in the corresponding week two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Sept. 21 stood at 96.1, as against 96.3 for both the week before and two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Sept. 18 were 9 per cent above those in the corresponding week last year.

STOCK MARKET

The stock market last week was highly irregular. The prices of some special stocks advanced, and a few new highs were recorded. However, the publication on Friday of an increase in brokers' loans for the week ended Sept. 18 and an increase in the call money rate brought about a rather substantial decline, and most issues closed the week with net losses. Call money ranged from 7 to 10 per cent.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Sept. 18 showed increases of \$19,000,000 in holdings of bills bought in the open market and of \$19,000,000 in holdings of Government securities, but a decrease of \$39,000,000 in holdings of discounted bills. The reserve ratio on Sept. 18 was 73.8 per cent, as compared with 73.7 per cent a week earlier.

Breaks Motorcycle Record at 134 m.p.h.

MUNICH, Sept. 19—A new world's record for motorcycles was established today by Ernst Henne over a one kilometer course with a flying start. Henne, who has been training for several days, succeeded in breaking the existing world's record of 207 kilometers by eight kilometers, using Bavarian Motorworks compressor machine. This equals 134.4 miles an hour.

International and Curtiss Groups Form Cuban Firm

NEW YORK, Sept. 25—Entry into the commercial air transport activities with Cuba has been inaugurated by two of the leading aeronautical groups in this country. Intercontinent Aviation, Inc., one of the Curtiss-Keys group of aviation companies, has formed the Compania Nacional Cubana de Aviacion Curtiss, s.a., to act as sales and service organization in Cuba. In addition to the selling of planes and parts in the Cuban market, this company will inaugurate passenger and mail airways, cross-country, taxi, aerial photographic services and a complete system of aviation ground and flying instruction schools.

The Fairchild Aviation Corp. unit of the Aviation Corp. has organized the Cuban Flying Service, Inc., which will have planes available for charter for all purposes. It will maintain a sightseeing service, carry passengers and freight, make aerial photographs, maps and surveys, maintain service and hangar facilities and aircraft and accessory sales agents.

Packard of N. Y. Sets New High

NEW YORK, Sept. 25—Packard Motor Car Co. of New York delivered 1601 cars during August and sold 1705. This compares with the best previous month in the company's history, when sales were 1193 and deliveries 1295. Lee J. Eastman, president of the New York company, in commenting on this states that these figures have exploded the old theory that there must be a slump in automotive sales during the summer. These figures established in August this year are all-time records for the company to date.

Imperial Airways Show More Profit

LONDON, Sept. 24 (Special)—The statement published by Imperial Airways, relating to the fiscal year recently ended, shows a profit of £78,861 against £72,567 for the previous year after providing £36,175 for obsolescence. The dividend is increased from 5 to 7½ per cent. The amount of the Government subsidy is not disclosed, but it is unofficially stated to be more than the net profit, so that the company is not yet on a self-supporting basis. Last year's subsidy was £137,000.

Olds is Expanding Factory Facilities

Two-Year Program Has Added 1,250,000 Sq. Ft. to Motor Works

LANSING, MICH., Sept. 25—The Olds Motor Works announced this week that additions, increasing the floor area of the Oldsmobile-Viking plants by 35,550 sq. ft., will be built to the engine plant and engineering laboratories. The total of new floor space added to the plant during the building expansion of the company, dating back more than two years, will have been brought to approximately 1,250,000 sq. ft. Eleven large structures and numerous additions have been built during this expansion.

Work on the new parts and service building is nearing completion and installation of equipment is to be started soon. It is probable that this building will be put in use next month, according to officials.

The new administration building of the company also is being completed rapidly, the outer construction work being practically finished at this time, while the interior work is getting well under way. Rapid progress also is being made on the large addition to the company's sheet metal plant.

The addition to the engine plant will be 75 by 141 ft. and the engineering laboratory will be enlarged to a total of 14,400 sq. ft.

Approximately 7800 Oldsmobile and Viking cars will be produced in September, according to factory officials. This will bring the total production for the first nine months of this year to about 97,400 cars as compared with 76,593 for the same period last year.

Schlee-Brock Issues Stock

DETROIT, Sept. 24—A new issue of 75,000 shares of Class A no par common stock and 75,000 shares of Class B no par common stock in the Schlee-Brock Aircraft Corp. of this city has been announced. The stock is being offered in units of one share of each class at \$10 per unit. Centralization upon completion of this financing will consist of 100,000 shares of the Class A stock of which all will be outstanding, and 250,000 authorized shares of Class B stock of which 150,000 shares will be outstanding.

The corporation was organized by Edward F. Schlee and William S. Brock, whose flight from Detroit to Tokio is a part of aviation history. Their purpose in the company is to create a strong sales organization to represent leading aircraft both of the land and water type. The corporation is now sales representative of the Lockheed Aircraft Corp. and the Bach Aircraft Co., Inc. It has a hangar, 120 by 80 ft., adjoining the Detroit City Airport, and a service machine shop building, 52 by 140 ft., is now under construction.

Automotive Plant Building is Active

Industrial Construction Maintains Upward Curve Despite General Recession

PHILADELPHIA, Sept. 26—Although August building statistics indicate that the decline in new construction is still falling, additions to automotive plants are being planned in all manufacturing centers.

Residential construction has suffered a sharp recession for the first eight months of the year, but industrial construction has mounted, according to the F. W. Dodge Corp.

Among the contemplated additions and projects under way are:

Frank S. Parker, New York architect, filed plans for six-story service and repair garage to cost \$500,000 with equipment.

Thompson Interstate Airways Corp., Flushing, N. Y., plans airport on 280-acre tract in Northvale and Rockleigh Boroughs, Bergen County, N. J., consisting of hangars, shops, etc., to cost \$500,000 with equipment.

Martin Trailer Co., Westfield, Mass., plans factory to cost \$40,000 without equipment.

Hartford Bearings Co., Hartford, Conn., has been organized to manufacture pressed metal bearings and sheet stampings.

General Motors Corp., Detroit, has plans by Albert Kahn, Inc., architect and engineer, for parts and service building at Pittsburgh, to cost about \$150,000 with equipment.

Faith Mfg. Co., Chicago, radiators, etc., asked bids for 2-story plan to cost about \$45,000 with equipment.

Davenport Airways, Inc., Davenport, Iowa (N. H. Tunnicliff), plans airport and flying field at Cramfield, near city limits, including hangars, etc., to cost \$100,000 with equipment.

Horace E. Dodge Boat & Plane Corp., New York, purchased 100-acre tract at Newport News, Va., for new \$1,000,000 plant to manufacture motor boats, flying boats, amphibian airplanes and kindred seacraft.

North American Lloyd Aircraft Corp., New York, has plans for airport at Jamestown, N. Y., including hangar, with repair facilities and other buildings to cost \$100,000.

Firestone Tire & Rubber Co., Akron, has awarded general contract to Burger Iron Co. for seven-story addition to cost \$750,000, of which about \$350,000 for equipment.

Bendix Brake Co., South Bend, awarded contract to H. G. Christman Co., for addition, to cost \$45,000 with equipment.

Firestone Tire & Rubber Co., Akron, plans factory branch storage and distributing plant at Kokomo to cost \$80,000 with equipment.

E. G. Beaumont has awarded general contract to Christy-Dolph Construction Co., Beaumont, Texas, automobile service, repair and garage building, to cost \$100,000 with equipment.

Aero & Auto Engineering Co., Tampa, Fla. (F. L. Ludwig), leased 40 acres in Hillsborough Bay district, for flying school and airport, including hangars, etc., to cost \$100,000 with equipment.

Delco Products Co., Dayton, Ohio, planning expansion, including 5-story factory unit, to cost \$200,000 with equipment.

Financial Notes

Seiberling Rubber Co. has declared regular quarterly dividend of \$2 on preferred stock, payable Oct. 1 to holders of record Sept. 20.

Reynolds Spring Co. and subsidiaries report net profit for six months ending June 30 of \$127,651 after depreciation and interest. This compares with \$3,684 for the corresponding period a year ago. Earnings for the June quarter were \$81,829 and compare with \$2,401 for the same quarter of last year.

Aero Supply Mfg. Co. has declared regular quarterly dividend of 37½ cents on Class A stock payable Oct. 1 to holders of record Sept. 18.

Doehler Die Casting Co. has declared regular quarterly dividend of 87½ cents on seven per cent preferred and \$1.75 on \$7 preferred, both payable Oct. 1 to holders of record Sept. 20.

Kelsey-Hayes Wheel Co. has declared regular quarterly dividend of \$1.75 on preferred, payable Nov. 1 to stockholders of record Oct. 21.

Nachman-Springfilled Corp. reports orders

Western Air Express, Inc., Los Angeles, plans expansion at airport at Alva, Okla., to include construction of hangar, etc., to cost \$70,000.

Packard Motor Co., Detroit, plans for 3-story service, repair and garage building at Kansas, Mo., to cost \$175,000 with equipment.

Fresno Auto Body & Fender Works, Inc., Fresno, Cal., plans for new plant to cost \$50,000 with equipment.

Durant Motor Co. of California, Inc., Oakland, Cal., files plans for addition to cost \$60,000 with equipment.

Skinner Co., Ltd., Gananoque, Ont. (automobile bumpers, etc.), awarded contract to Ferguson Contracting Co., Ltd., Toronto, for plant at Oshawa, Ont.

Noblitt Sparks Industries, Inc., reported largest month in the history of the business during September.

Auburn Announces Show Plan

AUBURN, IND., Sept. 25—Auburn will have one of the most outstanding

are the highest in the company's history and are steadily increasing.

Perfect Circle Co. reports August sales were the largest of any month in the history of the company. For the six months ended June 30, 1929, the concern showed net income after all charges, including taxes, of 495,704 or \$3.05 a share as compared with \$330,887 or \$2.02 a share for the corresponding period of 1928.

Commercial Credit Co. reports net earnings for the first seven months of the current year of \$3,591,688 after all charges. This is equivalent after preferred dividends to \$2.82 a share on outstanding common stock. For the quarter ended July 31, the company's earnings aggregated \$1.53 a share on common stock.

Black & Decker Mfg. Co., Baltimore, reported for 1929 surplus, available for the common stock, of \$1,065,971, after charges, Federal taxes and preferred dividends.

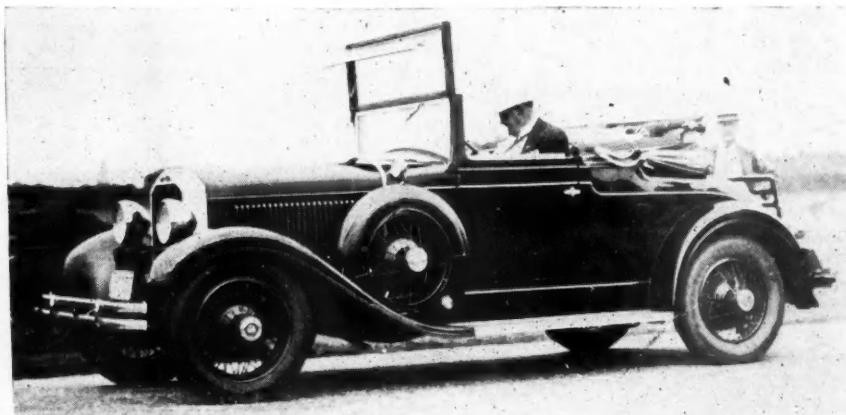
Curtiss-Wright Corp. reports unfilled orders on Aug. 31 amounted to \$21,942,998, as against \$15,294,451 on July 1, 1928.

displays at the Paris Annual Salon, Oct. 3-13, that any American car manufacturer has ever shown. Five Cord front drive cars, ten or more Auburns, including four convertible models, and four Duesenbergs will be shown.

Charles J. Moore

Charles J. Moore, formerly manufacturing manager for the Packard Motor Car Co., and for many years a prominent figure in the vehicle and machinery fields, died Sept. 20 in Longmeadow, near Springfield, Mass., where he had lived in retirement for the last seven years. In 1901 he joined the Packard organization and was identified with it for 20 years. He took great interest in safety work and was formerly vice-president of the National Safety Council.

Orders Gas-Electric-Drive Roadster



Col. E. H. R. Green is shown driving his new gasoline-electric-drive automobile, built for him by the Rauch-Lang Corp., of Chicopee Falls, Mass., and the General Electric Co.

Foreign Capital Producing Two-Thirds of Germany's Newly Registered Cars

BERLIN, Sept. 23 (Special)—According to the German Automobile Makers Association, foreign makers and foreign capital were directly or indirectly responsible for two-thirds of the new cars registered in Germany last year. About 124,000 passenger cars were registered in Germany.

Of these, about 25,000 were brought in the market by the assembly plants of foreign makers, who imported most of the material. This makes 21 per cent of the total. Approximately 17,800 cars were imported whole, which makes another 14.5 per cent, so that in all 35.5 per cent of the new cars were directly of foreign origin. If to these is added the cars made by works in Germany, the capital of which is wholly or partly foreign, a total of 67.5 per cent results. It is pointed out that Opel has become American and this factory

produces about half of all small cars up to 91 cu. in. piston displacement. As these cars account for roughly 60 per cent of all new cars, this alone almost makes 30 per cent. Then there is N.S.U., half of the capital of which maker belongs to Fiat, and a quarter of the capital of which is in the hands of Ambi-Budd and Schroder, London.

The B.M.W. company, last year took possession of the Dixi works at Eisenach and thereby became the second largest producer of small cars in Germany next to Opel. About a quarter of the capital of this company belongs to the banker Castiglioni.

Taking into consideration the percentage of the foreign participations in these works, the part of their production to be ascribed to their foreign capital amounts to about 40,000 cars, the report shows.

Houdaille Will Issue Stock for New Equipment

BUFFALO, Sept. 25—Owing to the increase in the volume of business of the Houde Engineering Corp., the shock absorber division of the Houdaille-Hershey Corp., directors of the latter corporation have authorized an appropriation of approximately \$200,000 for the purchase of additional equipment to be installed in the company's plant at Buffalo. Houde Engineering Corp. manufactures the Houdaille hydraulic double acting shock absorber.

Extensive additions are being made to plants and equipment of the General Spring Bumper Corp. at Chicago and Decatur, the bumper division of the Houdaille-Hershey Corp. These additions are being made to take care of the greatly increased volume of business being done by that division of the Houdaille-Hershey Corp.

Claire L. Barnes, president of the Houdaille-Hershey, states that production of the bumper division for the first eight months of 1929 was 90 per cent in excess of that for the corresponding period in 1928.

Offers \$35 for Donner Stock

BUFFALO, Sept. 25—Minority stockholders of Donner Steel Co., the majority of whose stock is reported to have been purchased by Cyrus S. Eaton, of Cleveland, have received an offer from the Marine Trust Co., acting as agent, to purchase common stock of the Donner Co. at \$35 a share. The offer expires September 27.

Accompanying the letter from Marine Trust Co. was a letter from William H. Donner, president of Donner, which said, in part: "During the past summer negotiations were undertaken for the sale of a substantial block controlled by my interests of outstanding common stock of Donner Steel Co.

These negotiations resulted in an agreement for the sale of the said stock at \$35 a share. One of the conditions of the sale requires the purchaser to offer to purchase the remaining outstanding shares of common stock at the same price."

Study of Western Roads Begun by U. S. Government

WASHINGTON, Sept. 25—The Bureau of Public Roads announced this week that it has undertaken a study of motor traffic on western highways in conjunction with the highway departments of 11 Western States.

The survey will cover a period of one year and is designed to determine the flow of traffic throughout the year on the main transcontinental highways and other roads in the Federal-aid highway system in the West. The states cooperating are Washington, Oregon, California, Idaho, Nevada, Wyoming, Utah, Arizona, Colorado, New Mexico and Nebraska.

Plans Bettis Improvement

NEW YORK, Sept. 24—Curtiss Airports Corp., which recently acquired Bettis Field, Pittsburgh, from the Aircraft and Airways of America, is laying plans for the improvement of this field to provide adequate ground facilities for a flying service base and transport company terminal. Bettis Field has long been one of the principal ports of call for all flyers hopping over the Alleghenies.

Sky Specialties Asks Listing

DETROIT, Sept. 25—Application is being made to list 125,363 shares of no par stock, the entire outstanding capital stock of the Sky Specialties Corp., on the Detroit Stock Exchange. There is no funded debt or preferred stock. The company was formed in June this year by the merger of Heywood Starter Corp. and the Simon Airplane Appliance Co.

August Production Reached 513,843

United States and Canada Totals Show Drop From Last Month

WASHINGTON, Sept. 24—As reported in last week's *Automotive Industries*, total August production of passenger cars and trucks in the United States and Canada was 513,843, according to figures compiled by the Department of Commerce from reports of 148 manufacturing concerns in this country and from the Dominion Bureau of Statistics.

August production compares with an output of 492,543 units for the same month in 1928 and with a production of 517,854 units for the previous month of this year. Passenger car production during August numbered 455,748 and truck production 58,095.

Production for the first 8 months of this year was 4,443,450 units compared with 3,236,364 in the corresponding period of last year, a difference of 1,207,086.

The following table is based on the Department of Commerce report and shows revised figures for July of this year:

	1928	Cars	Trucks	Total
Jan.	212,351	27,840		240,191
Feb.	301,466	34,834		336,300
March	387,048	43,735		430,783
April	385,394	48,921		434,315
May	405,627	54,098		459,725
June	381,963	43,232		425,195
July	358,914	58,398		417,312
August	424,867	67,676		492,543
	2,857,630	378,734		3,236,364
Sept.	375,463	61,044		436,507
Oct.	353,162	62,658		415,820
Nov.	225,608	43,401		268,909
Dec.	212,727	30,814		243,541
	4,024,590	576,551		4,601,141
	1929	Cars	Trucks	Total
Jan.	366,610	55,927		422,537
Feb.	433,400	64,239		497,639
March	548,256	77,587		625,843
April	573,303	89,934		663,237
May	542,502	93,128		635,630
June	470,513	96,354		566,867
July	440,813	*77,041		*517,854
August	455,748	58,095		513,843
	3,831,145	612,305		4,443,450

* Revised.

Asks U. S. Control of Buses

WASHINGTON, Sept. 24—A resolution adopted by the Legislature of the State of Illinois urging the Federal government to enact legislation to regulate and control the activities of interstate bus lines was presented to the Senate this week and referred to the Senate Committee on Interstate Commerce for consideration.

For several years there has been before Congress a bill providing for the regulation of motor bus traffic but it has never been before that body for final action.

M.E.A. Chicago Show Plans are Announced

CHICAGO, Sept. 25—The Eleventh Annual Automotive Equipment Show, which will be held at the Coliseum in Chicago, Nov. 4-9, promises to be one of the most interesting and best attended in the history of the Association, according to M. C. DeWitt, chairman of the M.E.A. show committee. The Coliseum Convention Hall, where the convention will be held, will be equipped with a new ventilating system and new cushioned arm chairs. Loud speakers also have been installed to carry the speakers' voices to every corner of the big convention room. Hotel headquarters will be at the Stevens Hotel.

Automobiles Take Lead

WASHINGTON, Sept. 26—During the first half of 1929 the automobile took first place from cotton, the undisputed leader of America's export trade since the Civil War. Exports of automobiles, parts and accessories for the first half of the year, the report of the Chamber of Commerce of the United States shows, totaled \$339,160,000, an increase of 36.4 per cent over the same period a year ago. At the same time, exports of raw cotton, amounting to \$319,821,000, declined 13.9 per cent in value as compared with the same period a year ago.

Steel Meet Attendance

CLEVELAND, Sept. 24—Total attendance at the Eleventh Annual Convention of the American Society for Steel Treating held here recently was 53,121. More than 6000 members and guests of the institute and cooperative associations registered and over 8000 attended technical sessions, according to W. H. Eiseman, secretary.

Cord Production is 35 Per Day

AUBURN, IND., Sept. 25—Production of the Cord front-drive automobile is moving at an even rate here despite the overwhelming number of orders received to date. Production is now approximately 35 cars daily.

S.A.E. Housewarming Opens Meeting Place

NEW YORK, Sept. 24—The Metropolitan Section of the Society of Automotive Engineers opened its season last week with a housewarming of its new meeting place at Fifty-seventh Street and Ninth Avenue. The first meeting of the season was purely social and members brought their wives and their friends to attend the dinner which was interspersed with dancing and entertainment. Approximately 200 members, wives and guests of the section attended this opening evening of the season.

S.A.E. Production Session

CLEVELAND, Sept. 25—The Society of Automotive Engineers, Inc., has announced to its membership the program for its technical production sessions, Oct. 2, 3 and 4. Prof. F. E. Raymond, Massachusetts Institute of Technology, will speak Wednesday. The annual production dinner will be held Friday evening.

Ford Ships Equipment to Russia

NEW YORK, Sept. 24—A large shipment of machinery and equipment for the new factory which Henry Ford is to build in Russia for the manufacture of automobiles for that market left last week on the Export of the Export Steamship Co. The shipment also included material for the city which is to be built on the site of the factory.

Trenton Radiator Issues Catalogs

TRENTON, N. J., Sept. 24—The Trenton Auto Radiator Works of Trenton, N. J., is distributing catalogs of the Kramer Line of Replacement Radiators for popular cars; Kramer Cellular and Tubular Cores and Kramer Products for tools and supplies.

European Board Sanctions Automobile, Cycle Shows

The following automobile shows have been sanctioned by the Federation of National Automobile Manufacturers Associations (Bureau Permanent):

New York—First half of January.
Chicago—End of January and first part of February.

Amsterdam—Jan. 24-Feb. 3.
Rome—End of January and beginning of February.

Cairo—First half of February.
Copenhagen—End of February and beginning of March.

Vienna—Sample Fair, first half of March.
Geneva—Last half of March.

Geneva—Tel-Aviv exhibition, April.
Antwerp—International colonial, marine and Fleming art exposition, May 1-Nov. 1.

Paris—Passenger cars, Oct. 2-12.
Paris—Motorcycles, Oct. 23-Nov. 2.

Paris—Commercial vehicles, Nov. 13-23.
London—Passenger cars, last half of October.

Prague—October.
Brussels—Dec. 6-17.

The German Automobile Manufacturers Association has sanctioned the Leipzig Spring Fair for the exhibition of tractors, trailers, dump bodies, electric industrial trucks and corresponding accessories.

Dodge Exports Increase

DETROIT, Sept. 24—Dodge Brothers export shipments of trucks and commercial cars from plant in the United States and Canada totaled 8163 units for the first eight months of this year, a new all-time record and an increase of more than 11 per cent over the corresponding period last year. Indications are that the rest of the year will show substantial increases in export business inasmuch as full production is under way on all models recently added, according to C. W. Matheson, general sales manager.

Brake Lining Meet Dec. 11

NEW YORK, Sept. 25—Asbestos Brake Lining Association will hold its annual meeting on Wednesday, Dec. 11, in New York, according to W. J. Parker, commissioner.

Calendar of Coming Events

SHOWS

National Machine Tool Builders' Exposition and Congress, Cleveland, Sept. 30-Oct. 4
Paris, Automobiles Oct. 3-13
London, Automobiles Oct. 17-26
Prague, Automobiles Oct. 23-30
Paris, Motorcycles Oct. 23-Nov. 3
M.E.A. Show and Convention, Chicago Nov. 4-9
N.S.P.A. Show and Convention, Detroit Nov. 11-16
Berlin Auto Salon Nov. 14
London, Trucks Nov. 7-16
Paris, Trucks Nov. 14-24
London, Motorcycles Nov. 30-Dec. 7
Brussels Auto Salon Dec. 7
New York National Jan. 4-11
Newark (N. J.) Automobile Show Jan. 11-18
Boston Automobile Show Jan. 13-25
Chicago National, Coliseum Jan. 25-Feb. 1
Cleveland Automobile Show Jan. 25-Feb. 1

CONVENTIONS

American Drop Forging Institute, Shawnee-on-Delaware Sept. 25-27
American Electric Railway Association, Atlantic City Sept. 28-Oct. 4

Asbestos Brake Lining Assn., New York Dec. 11
National Industrial Advertisers Assn., Cincinnati Sept. 30-Oct. 2
National Safety Congress, Annual, Chicago Sept. 30-Oct. 4
Ohio Assn. of Commercial Haulers, Cleveland Jan. 30-31
Penns. Automotive Association, Erie, Pa. Oct. 7-8
Permanent International Association of Road Congresses, Sixth Session, Washington, D. C. Oct. 7-11
Associated Business Papers, Chicago, Oct. 21-22
Society of Industrial Engineers, Detroit Oct. 16-18
National Hardware Association, Atlantic City Oct. 21-24
Society of Industrial Engineers, Sixteenth Annual Meeting, Hotel Statler, Cleveland Oct. 23-25
National Battery Mfrs. Assn., Hollenden Hotel, Cleveland Oct. 24-25
Amer. Gear Mfrs. Assn., Phila. Oct. 24-26
World Engineering Congress, Tokio, Japan Oct. 29-Nov. 22

National Automotive Parts Association, Detroit Nov. 6-8
Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13

National Automobile Dealers Association, New York City Jan. 6

American Roadbuilders Association, Atlantic City Jan. 11-18

National Automotive Dealers Association, Chicago Jan. 27-28

Southwest Road Show and School, Wichita Feb. 25-28

RACES

Edsel B. Ford Air Tour, Dearborn, Mich. Oct. 5-21
Los Angeles Nov. 17

S. A. E.

Production Meeting, Cleveland Oct. 2-4
Transportation Meeting, Toronto, Nov. 12-15
Annual Meeting, Detroit Jan. 21-24

SALONS

Hotel Drake, Chicago Nov. 9-16
Hotel Commodore, New York City. Dec. 1-7
Hotel Biltmore, Los Angeles Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1